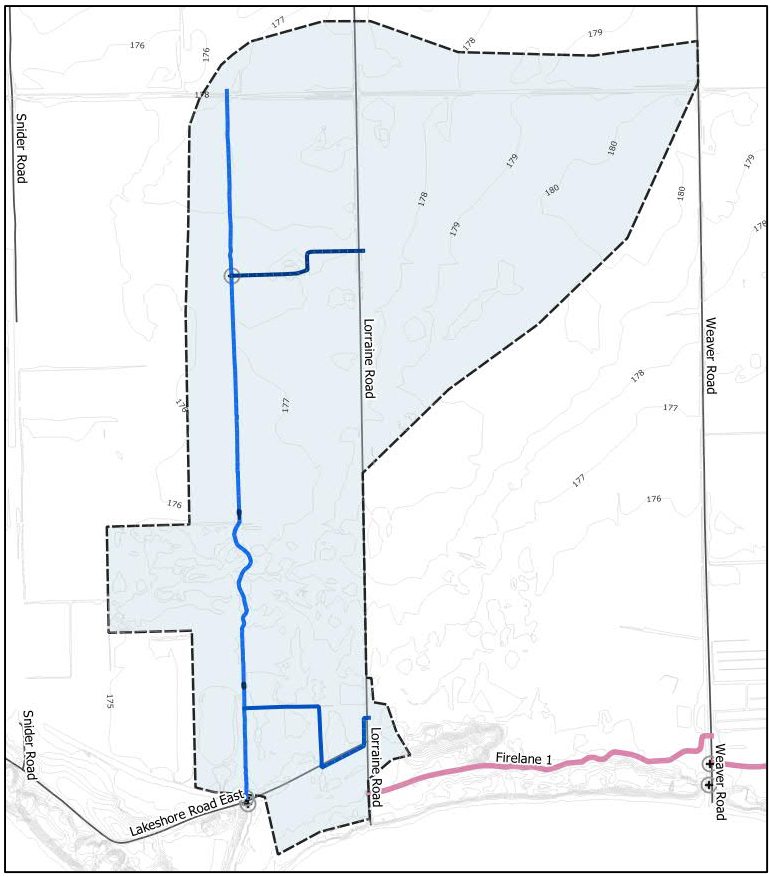
Michener Municipal Drain Report



May 7, 2020

Project No: EWB-189999

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May 7, 2020

Attention: Alana Vander Veen
Drainage Superintendent
City of Port Colborne
1 Killaly Street West
Port Colborne, Ontario
L3K 6H1
alanavanderveen@portcolborne.ca

Dear Ms. Vander Veen:

We are pleased to present our final report for the Michener Drain.

From the first point of opportunity to work with the City of Port Colborne, this assignment has been interesting and challenging. We prepared several options and analysis in consultation with yourself and local residents to identify a preferred solution that we expect will meet the projects's requirements.

This Drain has a significant history behind it and the previous work done by other Engineering companies created a unique challenge to compose a final report based on new analysis of opportunities for maintaining the drain and improving it.

Our report identifies design improvements that will increase the drain's function through maintenance activities, through maintenance of design grade and implementation of flow control structures at key points. The addition of two new Branch Drains from the City's Section 4 petitions have been achieved through design documents, assessment schedules and future maintenance provisions.

Thank you for relying on EWA Engineering for this assignment.

Yours truly,

Paul C. Marsh, P.Eng.

Principal Engineer
EWA Engineering Inc.

Revision and Version Tracking

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Submission Date: May 7, 2020

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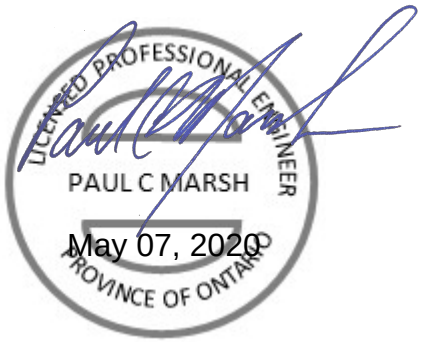

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1 Executive Summary

The Michener Municipal Drain is located in the Eastern portion of the City of Port Colborne. It has an outlet into the Wignell Drain, immediately north of Lakeshore Rd. East and the drain currently ends just north of the Friendship Trail.

The City of Port Colborne retained Paul Marsh, P.Eng of EWA Engineers Inc. to prepare a Drainage Report under the Drainage Act R.S.O. 1990 for the Michener Drain.

The report includes a description of all work, and associated plans, cost estimates, and assessment schedules for the proposed work on the existing Michener Drain as well as for the proposed Branch Drains. The report has been prepared in accordance with the requirements of the Drainage Act, Chapter D.17 of the Revised Statutes of Ontario, Sections 4 and 78.

The proposed improvement work for the Michener Drain is prepared as a Section 78 (1.1) of the Drainage Act. The works are described as maintenance; including the rebuild of a sedimentation basin south of the golf course property.

The identification of the 2 existing channels as Branch Drains are being prepared under Section 4 of the Drainage Act.

This report has identified a series of drain improvements that include drain maintenance to ensure suitable channel design flows are achieved. The drain improvements have been developed through plan and profile drawings.

The following are summary descriptions of the planned improvements:

1. A specific program of work for channel improvement for the Michener Drain involving vegetation removal and re-grading to design grade line from 0+700 to 1+700. The existing grade line is being confirmed by grading work instead of being altered.
2. Spot Vegetation removal and basic maintenance at the outlet. Re-instatement of the identified sediment basin shown in the RVA drawings of Nov. 1996.
3. Inclusion of an original private drain as part of the Municipal Drain identified as Michener Branch Drain #2. This drain ensures the Lorraine Rd. Culvert CS-101 has a suitable outlet. Clearing and confirmation of grades are planned west of the existing pond. Upstream of the pond is minimum except spot clearing of fallen trees impacting the drain.
4. An original private drain previously crossing farmland is to be converted to Michener Branch Drain #1 that provided an outlet to roadway culverts on Lorraine Rd. and Lakeshore Rd. East. The proposed drain is to be open channel with a bottom tile for portions of the drain. The tile has a lower road crossing elevation with Lakeshore Rd. East culvert remaining for storm roadway runoff.

The following is a summary of the project financial values as prepared in the attached Assessment Schedule included in Appendix C.

Table 1 Michener Drain Costs

Items	Costs
Estimated Costs	$ 93,860.80
Eligible Administration Costs	$ 87,990.88
Calculated Allowances	$ 17169.64
Total:	**$ 199,021.32**

The Michener Drain is organized into three distinct catchment areas as follows:

- Branch Drain #1 serving 9.0Ha with a total open and closed conduit drain length of 505m.
- Branch Drain #2 serving 30.7Ha with an open channel drain 344m.
- Michener Drain serving 94.8Ha, (134.59Ha total catchment) with an open channel drain with several private crossings over 1728m in length.

Assessment Summary is as follows:

Benefit Assessment (Section 22)	
Michener Branch Drain #1	$3,673.00
Michener Branch Drain #2	$4,845.00
Michener Drain	$ 0.00
Total - Benefit Assessment (Section 22)	**$8,518.00**
Outlet Liability Assessment (Section 23)	
Michener Branch Drain #1	$29,827.28
Michener Branch Drain #2	$26,463.48
Michener Drain	$119,512.13
Total - Outlet Liability Assessment (Section 23)	**$175,802.89**
Special Benefit Assessment (Section 24)	
Michener Branch Drain #1	$0.00
Michener Branch Drain #2	$0.00
Michener Drain	$6,110.00
Total - Special Benefit Assessment (Section 24)	**$6,110.00**
Special Assessments (Section 26)	
Michener Branch Drain #1	
City of Port Colborne	$6,590.43
Enbridge	$2,000.00
Michener Branch Drain #2	$ 0.00
Michener Drain	$ 0.00
Total - Special Assessments (Section 26)	**$8,590.43**
Total Assessment of Costs	**$199,021.32**

This report and the proposed improvements are based on instructions from the City of Port Colborne and in consultation with the local landowners. The cost of these improvements is shared across all areas that use the Drain by way of allowances and assessments consistent with the Drainage Act of Ontario.

2 Introduction

The City of Port Colborne retained Paul Marsh, P.Eng of EWA Engineers Inc. to prepare a Drainage Report under the Drainage Act R.S.O. 1990 for the Michener Drain.

In addition to the Michener Drain Report, there are other Drain Reports being prepared concurrently and they are:

- Wignell Drain, outlets to Lake Erie across Lakeshore East Rd. and proceeds northerly for 7.2km.

- Port Colborne Drain, outlets to the Wignell at 2+062 South of the Friendship Trail and proceeds northerly for 3.3km ending at or near the Second Concession Rd.

This report includes a description of all work, and associated plans, cost estimates, and assessment schedules for the proposed work on the existing Michener Drain as well as for the proposed Branch Drains. The report has been prepared in accordance with the requirements of the Drainage Act, Chapter D.17 of the Revised Statutes of Ontario, Sections 4 and 78.

The proposed improvement work for the Michener Drain is prepared as a Section 78 (1.1) of the Drainage Act. The works are described as maintenance; including the rebuild of a sedimentation basin south of the golf course property.

The identification of the 2 existing channels as Branch Drains is prepared as a Section 4 of the Drainage Act based on a petition for sufficient outlet by the Road Authority, which is the City of Port Colborne. The petition forms for Section 4 are available on request to the City of Port Colborne, Drainage Superintendent A. Vander Veen.

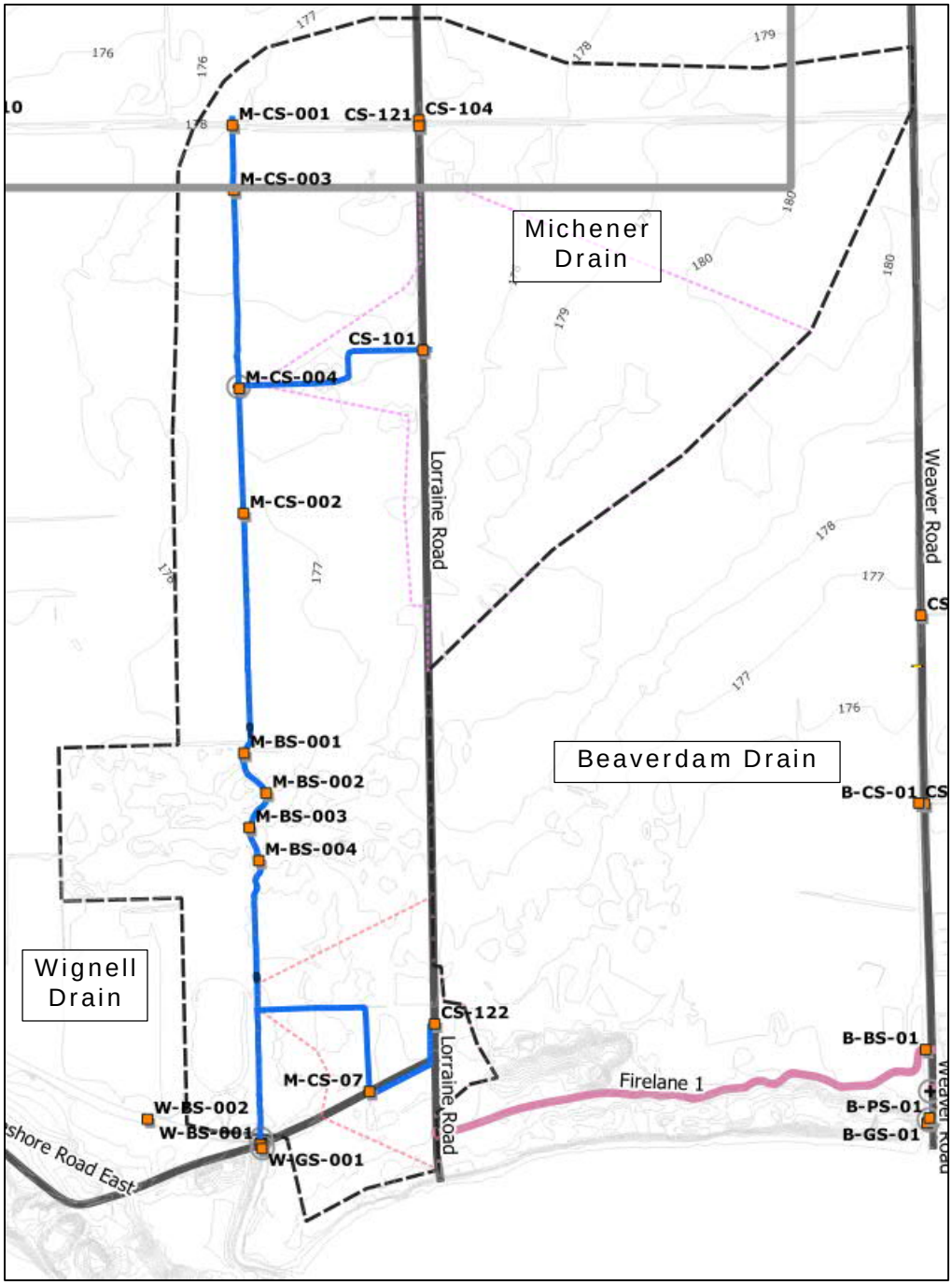


Figure 1 Municipal Drains - Michener Boundary

2.1 Objective

The Michener drain dates back as far as 1855 with the most current report dating back to July 28, 1978 which was adopted through Bylaw #773/89/78. The objective of this new report is to maintain the existing drain in a State of Good

Repair (SOGR). The drain has been impacted by changes in land use practices that affect their function. The drain capacity is degraded through growth of vegetation within the banks of the drain.

There are specific new channels proposed to improve drain function.

2.2 Drain History and Past Reports

The Michener Drain Engineer's Report is prepared as follows:

- Baseline Drainage Report; provides an assessment of current drainage problems and identifies the extent of the drainage area to be serviced by the municipal drain. Baseline report includes a history of drainage and presents past design information such as grade lines.

- Wignell Watershed Assessment Report; provides an assessment of existing capacity through the use of hydrologic and hydraulic modelling which identifies the options for resolving problems and recommends a preferred option to improve drainage.

The final Engineer's Report is composed of the two previous reports along with supporting documentation and final drainage cost estimates and assessment schedules.

2.3 Michener Drain Watershed

The Michener Drain Watershed is composed of a single distinct municipal drain that outlets to the Wignell Drain just north of Lakeshore Rd. East. The Michener Drain is 1728m open channel with a predominate top width of 2.5m, with the lower portion dominated by golf course operations and the upper portion agriculture land uses. The Michener drain serves an area of 135 hectares based on the defined drain boundary, refer to Figure 1 Municipal Drains - Michener Boundary.

The watershed boundary is north of the Friendship Trail with a high point of 178m. The upper portion of the drain is a narrow fringe of drainage area north of the Friendship Trail extending eastwards to Weaver Rd. The Michener outlet is just north of Lakeshore Rd East at the Wignell drain and is influenced by the change in Lake Levels. The recorded average lake level is given as 174.15. The lake level fluctuates and for 2018 and 2019 had monthly averages as high as 174.7m, which is higher than average and influences the water surface profile through the Mitchener Drain.

- Watershed average fall (slope) is given as 0.22% or 2.2m per 1000m

- Drain average fall (slope) is given as 0.13% or 1.30m per 1000m

This slope characterises the Michener drain as low slope or slow watershed. The Michener drain can be segregated into a few distinct geographic areas.

- Outlet; this area starts at station 0+000 chainage marker and is the outlet to the Wignell drain. The outlet is influenced by the water surface elevation in the Wignell drain and is defined by significant vegetation growth for the drain's first 50m.

- From station 0+050 to 0+300 Drain reach to outlet. This portion of the drain lies below the golf course and is a ditch with defined banks that runs to the outlet. Bank full or top width is approximately 4m.

- From station 0+300 to 0+695 Golf course; this reach is heavily managed by the golf course. Includes, pumping to reverse flow to irrigation ponds, changed bridge to culvert, vegetation removal, etc.

- From station 0+695 to 1+728 main drain ends; largely agriculture on either side of the drain but with an identified regulated wetland to the West starting at 1+000 and the drain is vegetated with undergrowth between banks and either side. Above 1+400, the drain has agricultural fields on either side.

Portions of the drain have become overgrown, degrading the performance of the drain throughout the drainage area. Along with physical changes to the Drain needed for continued service have necessitated a new Engineer's report be prepared under Section 78 of the Drainage Act R.S.O. 1990 and that the City petition for new works on this drain under Section 4 of the Drainage Act R.S.O. 1990.

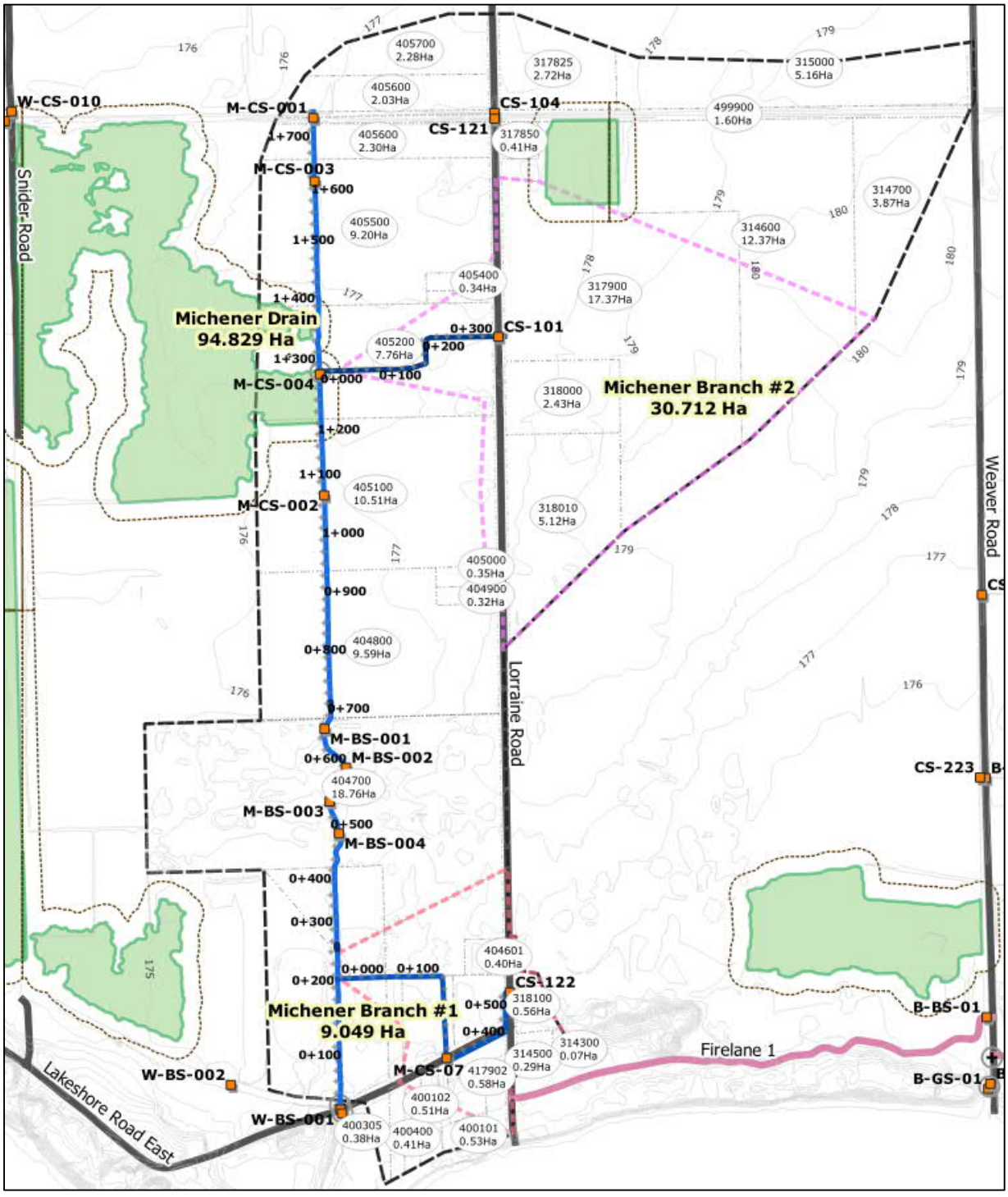


Figure 2 Michener Drain and Proposed Branches

A large format map is included in Appendix A that includes the Wetland boundaries and 30m buffer.

3 Design Considerations

The analysis of the Wignell Watershed is based on Hydrologic and Hydraulic analysis to predict runoff flow requirements and to match channel capacity. Water monitoring and gauge measurements have not been practiced in the past and thus calibration or validation of the computer based model results is limited to historical anecdotal comparisons.

3.1 Watershed Characterization and Use

The Michener Drain Watershed is characterized through land use as a design consideration in the following ways:

1. The upper portion of the drain land use is Agriculture with mainly row crops; soya, corn or cereal grains grown. The design service level for agricultural land is flooding with low velocities and drainage of ponding areas of 48 to 72 hours. Drainage is provided to improve working time and to avoid long term submergence leading to crop drowning.

2. Fringe or rural residential is the other major land use with estate lots with houses, buildings, wells and septic beds. Urban expectations of no ponding on residential lots in rural areas can not be met without extensive costs. Acceptable flooding without damage to property contents is the reasonable design service level similar to Agricultural service levels.

3. Whiskey Run Golf Course (WRGC) makes up a significant portion of the drainage area and the golf course operations affect the drain through irrigation and crossings. The WRGC has several permits to take water granted from the MOE that operate on the Wignell Drain but impact the Michener Drain. Past practice indicates the golf course conducted works on the Drain and may have impacted the identified sedimentation pond shown on the plans that were issued to introduce a sinusoidal pattern into the Drain, (Plan dated Nov. 15, 1996)

4. Michener Outlet. The primary design service level for the outlet is merely to have a positive slope to the Wignell Drain with clear and clean flow path to the outlet.

3.2 Former drain changes

The Michener Drain has been in use for a very long time. Over that time, changes have occurred and been abandoned. The description of these changes can be referenced in the Baseline Report.

4 Drain Works Recommendations

4.1 Design Criteria

Channel size is confirmed to be based on a 1 in 5 year return period storm, which is expressed as a design storm as follows:

- 5-year cumulative storm with a total rainfall amount of **68.90 mm** using a SCS Type II **24-hr** storm distribution.

The design storm is used to forecast a predicted runoff for identified catchments. Each channel section is designed to convey this runoff.

There are areas that owners have identified as wet and needing drainage. These problem areas are identified for service with underground based piping. Tile Polyethylene Pipe (PE Tile) is below an open channel, which will have conveyance for the design storms. The PE Tile does not meet these design storm criteria but provides post storm drainage in those problem areas. The design storm was based on the IDF curves for Port Colborne.

4.2 Description of the Works

The following presents a program of proposed improvement works for the Michener Drain. As a program, some works are staged at various times and may not proceed in a step by step manner but on a as and when available basis that best meets environmental and regulatory requirements.

4.2.1 Michener Drain Flow Improvement

The primary function of the proposed works for the Michener drain is maintenance of channel section and reduction of flow restrictions. This is for two key restoration efforts as follows:

Restoration works #1 is the removal of vegetation between top of bank to top of bank. This removal is targeted at tree and shrub growth that limits or could obstruct primary flow paths. Every effort to retain trees, not in the channel, and under story growth will be made to reduce environmental impacts of the maintenance work. A work zone is required for the channel improvements and this will be minimized but will remove trees and understory growth.

Restoration works #2 is to remove any deposition humps or deviations that are impeding flow. This does not include any changes to grades that were previously over excavated, past the calculated grade line, but does include channel bank

stabilization where slips or excessive erosion is evidenced during the restoration works #1. Channel restoration is done from one side with effort to reduce existing stable bank cover damage on the opposite side of the work zone.

Most of the proposed work for the Michener Drain is to re-establish the original drain capacity and function through the cutting of trees and vegetation that has grown up through the drain. The following figure illustrates a typical cross-section view of the work and work zone required to do the work.

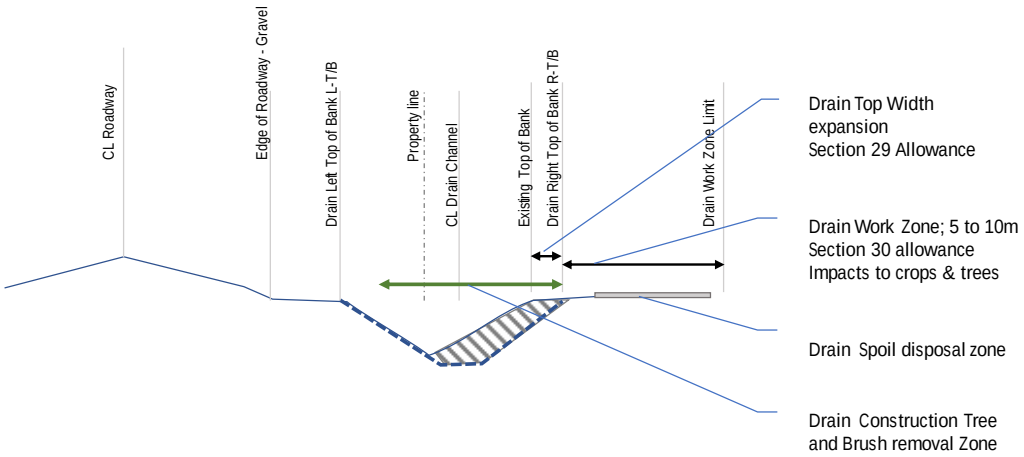


Figure 3 Typical Drain Work and Work Zones

With the main work program the original drain is cleaned down to the proposed grade line and a specific capacity is achieved through removal of soil to the design bottom width and one bank. It is beneficial to only disturb one bank and leave low vegetation in place. Trees through the drain top of bank (T/B) to top of bank (T/B) are removed leaving stump and roots in place if the removal negatively impacts the grade.

Living trees that are removed from the work zone are eligible for the canopy preservation program, replacement of 2 saplings for each removed tree with a DBH of 150mm or greater. Trees within the established banks, top of bank to top of bank, are not eligible unless for a new drain or a re-located drain.

4.2.2 Michener Branch Drains

There are two proposed branch drains identified on the design plans. Branch Drain #1 is an existing channel that flows water from East of Lorraine Rd. and South of Lakeshore Rd East that is clearly visible in the 1934 aerial photography of the area. This originally was an open channel that served an agricultural use, which has now converted to rural residential and golf lands.

Branch Drain #2 is an existing channel that provides outlet to lands East of Lorraine Rd. This channel has existed for a long time and is also visible in the

1934 aerial photo showing the existing pond midway between the outlet and Lorraine Rd. on a bend in the drain. Evergreen Trees outside the top of bank have been planted along the portion East of the pond and West of Lorraine Rd. The large mature trees are outside of the existing top of banks and will remain. One tree has toppled and the roots impact the channel definition, which is to be addressed by cleaning of this section of drain to re-establish the channel.

4.2.3 Municipal Crossings

The drain crossings, Private and Right of Way are shown in Figure 1. Lorraine Rd. presents a barrier to sheet overland flow and the road authority has established several road crossing culverts. These are not part of the drain as their flow is collected within the roadside or Right of Way and there after is conveyed to an outlet. There are three key municipal crossings.

- Lorraine Rd. Culvert CS-101 is an existing culvert currently outlets through a private drain, which the Road Authority has requested be made a Branch Drain (#2) to ensure a SOGR is achieved for the outlet.

- Lorraine Rd. Culvert CS-122 is an existing culvert that outlets flows from the East to Michener through an existing open channel. This is proposed as Michener Branch Drain #1

- Lakeshore Rd. East. Culvert M-CS-007 is an existing roadway culvert that has been the subject of conflict for drainage performance between north and south property owners. This culvert outlets to the open channel drain and is to be converted into a buried pipe to Michener Branch Drain #1.

The Friendship Trail, formerly CNR, is a significant barrier to overland flow and there is a major culvert crossing for flows to pass through the Trail into the Drain. The culvert crossing the Friendship Trail is identified as part of the Drain, while the channels to the North are considered part of the Friendship Trail ROW and not part of the drain.

4.2.4 Private Crossings

There are several private crossings identified on the Main Branch of the Drain as it bisects the agricultural lands. There are also four crossings identified through the golf course lands. The golf course crossings are predominately bridge decks with minimal piers and a replaced new CSP culvert that is undersized and to be replaced by double wall HDPE culvert sized for the design flow.

The farm immediately north of the Golf course has possessed a crossing that is identified as too narrow and fallen into disrepair. The farmer is or has established a fording located to the north property limits. This is to be replaced with a combination sediment basin and crossing located at the South limit of the farm north of the golf course.

4.2.5 Utility Conflicts & Coordination

Utility conflicts may exist with Gas lines and telecommunication lines as identified by the exchange of utility information. In particular, the placement of the proposed Ditch Inlets along Lorraine Rd. and Lakeshore Rd. East are to be field placed to minimize utility conflicts. Re-grading of the Roadside swales are to be positive to the Ditch Inlet.

4.2.6 Plans, Profiles & Specifications

The proposed Michener Drain works are described in the attached Plans, Profile drawings and Specific Design Drawing and Standard Detail Drawings attached as Appendix A.

Project Specifications are attached in Appendix B.

4.3 Construction and Constructability

The following describes the specific requirements for drain construction.

4.3.1 Vegetation Removal

Vegetation, specifically trees are to be cut down outside of any bird nesting periods. The remaining stumps are to remain in place unless they obstruct flow or they are Ash trees with re-growth from the lower truck already established. In those cases, the stump will be ground down to match the existing channel section.

Tree removal within the Top of Bank to Top of Bank is to be 100 percent; however, tree removal within the work zone is at the discretion of the drainage superintendent while making every effort to preserve trees where possible. Where trees are removed in the work zone, they qualify for the tree replacement program as per the tree qualifying criteria.

Where a mature tree is already established and is an individual tree, it can remain on the work zone adjacent to the drain provided there is a working space to provide future maintenance to the drain.

Trees with a DBH greater than 150mm and alive, such trees will be replaced with 2 trees as saplings for future growth in lieu of a damage allowance for the existing tree that is removed. The tree that is removed will be provided to the owner as stacked branches adjacent to the drain and outside of the working zone along with the trunk. The owner shall be wholly responsible for the wood once cut.

New trees can be planted adjacent to a drain following two key criteria:

- The trees are planted back from the top of bank, (the exact distance is determined by tree type and local conditions).

- The trees are planted with adequate space to provide future maintenance access for the drain. Grouping of planted trees is encouraged given that the spacing of the trees and the arrangement permits future maintenance. This is accomplished by providing an angled approach along the tree edge line to the drain and increasing the tree plant density only as the distance from the drain increases.

- Individual hardwood trees may be allowed every 25m. Trees of any type shall not be planted within 6m of an existing drain (solid tile, wrap joints) or 4.5m from existing open drain.

- In certain circumstances where an owner owns property on both sides of the open drain, upon consultation with the Drainage Superintendent, a windbreak may be permitted on one side. On existing drains where windbreaks exist, costs due to trucking material will be the direct responsibility of the owner and not the upstream ratepayers.

- Replacement Trees will be selected from a list of available preferred species at the time of construction for owners eligible for replacements to select their preferred species. Species will be from the identified list of Carolinian species typical for the Region. Owners can select any location for the planting of replacement trees excepting within the work zone.

4.3.2 Spoil Material

Where specified, excavated spoil material shall be disposed of and levelled at a minimum of 2.5 m from the top of bank to ensure that sediment does not re-enter the drain. Spoil placed next to the drain shall be spread to permit access across the berm area and shall be placed to a maximum height of 0.6m. Spoil excavated along existing travelled road allowances, and on private property where requested, shall be disposed of by the Contractor off site. The cost of spoil trucked from the property shall be borne by the benefiting property owner.

Spoil shall be disposed of as noted in the description of the proposed work. Generally, the spoils will be disposed of adjacent to the drain unless otherwise specified. Should any property owner require that all or a portion of the spoil be trucked away from their property, the cost of trucking spoils shall be assessed 100% to the property owner requesting same and will not form part of the total cost of the drainage works. The cost of trucking away spoils from any future maintenance work will be assessed directly to the property owner requesting the same. Debris from vegetation removal will be disposed of in accordance with agreement of the property owner. Debris removal from the site is possible where the owner of the land agrees to pay for the removal.

With respect to the reaches of drain that are within travelled municipal road allowances, the spoil will be trucked away during both the initial construction

and any future maintenance work where there is no opportunity to dispose of the material on site.

Access channels shall be provided through the levelled spoil material at every location where existing drainage outlets are visible and/or identified during construction by the Drainage Superintendent. The invert of the access channels shall be consistent with the drain cross-section at that location.

Spoil excavated from the drain shall be levelled in a manner that is suitable for cultivation of crops where crops were previously cultivated. Where the drain is adjacent to a grassed area maintained by the owner, the spoil shall be levelled and re-seeded with grass so that the area is restored to a like or better condition than prior to construction.

4.3.3 Sediment Control Basins

The addition of sedimentation basins to the Michener Drain in two locations is done to assist with controlling sediment during maintenance and re-grading to the identified design grade line. Post – Construction these basins remain and continue to provide sedimentation control during precipitation events.

Sediment basins are to be constructed at the locations and to the specifications indicated on the attached drawings. The Contractor will maintain these sediment basins during construction, as directed by the Engineer and/or his designate. The basins are considered to be part of the Municipal Drain and will be maintained in future by the Municipality at the expense of all upstream land and roads owners herein assessed as shown on the attached assessment schedule. Properly maintained sediment basins reduce the incidents of drain maintenance clean out and therefore reduce overall maintenance costs for property owners. It is anticipated that basins will be inspected annually for an assessment of sediment depth and sediment removed where that depth exceeds half the constructed depth.

4.3.4 Revegetation

Drain banks and exposed soil areas within areas disturbed during the maintenance of the drain are to be seeded as quickly as possible by the contractor.

The drain banks should be seeded as quickly as possible after excavation of the existing and proposed channels, and the spoil should be seeded on the day of leveling. Seeding should take place in a manner that optimizes seed germination and establishment of vegetation prior to mid October and after late April.

Seed mixture used shall be applied at a rate of 40 kg/ha in the following proportions:

Creeping red fescue	20 kg	50%
Perennial rye grass	8 kg	20%
Birdsfoot trefoil	12 kg	30%
Total	40 kg/ha	100%

Through the golf course, the owner may choose an alternate re-seeding mix and/or restoration method at their preference and cost.

Where working zone adjacent to the drain is grass and this is affected by construction, this area shall be reseeded with a suitable grass mix to restore to a like or better condition.

4.3.5 Private Drain Connections

Where private connections are made to the Municipal Drain, the connections are to be compliant with the City of Port Colborne's standards connection designs. This includes the following connection types:

- Open channel connection – minimal allowance for grade and freeboard.
- Surface water flows – rip rap rock requirements for reducing or amending sites of potential or evident erosion.
- Tile drain connections – use of PE pipe to connect to a receiving channel.
- Berm and Orifice Flow Control - connections designed to control runoff to specified rates of flow.

Private connections are owned and the landowner is responsible for their construction and maintenance. Where a deficiency is identified by the Drainage Superintendent or Engineer, the landowner is to make good the connection. The landowner can accept to have work done by the City on their behalf to make good the connection based on a 50/50 cost sharing basis. Where the City identifies a deficiency and the repairs are not made by the landowner by the next cycle of drain maintenance, the City can make the required repairs and 100% of the cost will be assessed to the landowner.

4.4 Future Maintenance and Repair Provisions

The Drainage Act, Chapter D.17, Sections 74 through 84 governs future maintenance, improvement and repair to any Drainage Works constructed under a By-Law passed under this Act, or any predecessor of this Act.

Upon completion of the Michener Drain works prescribed in the Engineer's Report, the City of Port Colborne will be responsible for future maintenance of the drain with the cost assessed to the upstream lands and roads using the Assessment Schedule in Appendix C, and pro-rating the assessment based on the actual cost using the Outlet Liability Assessment – Section 23. Special Benefit or Special Assessment, Section 24 or Section 26, shall not apply to maintenance work except where maintenance works are related to culvert/bridge replacement or upgrades.

4.5 Summary of Construction

The following table provides a list of construction activities by property starting from the outlet and proceeding upstream.

Michener Drain

Property / Owner / Drain Side	From STA	To STA	Work Description	Access & Disposal
404301 570466 ONTARIO LTD West side	0+004	0+407.5	0+010 to 0+110, 100m of individual tree removal from T/B to T/B 0+260 to 0+268 Construct Sediment Basin - SD-03a) 0+268 to 0+407.5 Re-grade to Design Grade Line 0+000 to 0+215 BW = 1.0m SS=1.5 TW = 4.0m 0+215 to 0+400 BW = 0.8m SS=1.5 TW = 3.8m	Work zone is 10m on the West Side of the Drain. Tree Removal as required for access. Level spoil West Side of Drain
404700 WHISKEY RUN GOLF CLUB LTD Both Sides	0+407.5	0+695.3	0+428 to 0+695.3 sinusoidal channel BW=0.6m SS=1.5 TW=1.5m Preserve existing Bridge Decks through construction Replace existing 500mm CSP with 600mm HDPE	Work Zone is 10m. Side to be determined in cooperation with Golf course. Restore to pre-construction condition.
404800 SPITERI CHARLES Both Sides	0+695.3	0+947	0+705.8 to 0+715.8 Farm Crossing culvert 0+715.8 to 0+723.8 Construct Sediment Basin 0+723.8 to 0+947 Clear vegetation from T/B to T/B and as required in work zone. BW = 1.m SS =1.5m TW = 4m	Work zone is 10m on the East Side of the Drain. Level Spoil on East side. Restore to cultivated field condition. Allowance for damage.
405100 VALE CANADA LIMITED Both Sides	0+947	1+206	0+947 to 1+206 Clear vegetation from T/B to T/B and as required in work zone. BW = 1.m SS =1.5m TW = 4m	Work zone is 10m on the East Side of the Drain. Level Spoil on East side. Restore to cultivated field condition. Allowance for damage.
405200 VALE CANADA LIMITED Both Sides	1+206	1+399.5	1+206 to 1+280 Clear vegetation from T/B to T/B and as required in work zone. BW = 1.m SS =1.5m TW = 4m 1+280 to 1+286 Culvert to remain as is. 1+290 Branch #2 Confluence 1+290 to 1+399.5 BW=0.6m SS=1.5 TW=3.4m	Work zone is 10m on the East Side of the Drain. Level Spoil on East side. Restore to cultivated field condition. Allowance for damage.
405500 ADAMS KEVIN JAMES Both Sides	1+399.5	1+649	Clean and Re-grade to Design Grade Line 1+399.5 to 1+614 BW=0.6m SS=1.5 TW=3.4m 1+614 to 1+624 Replace existing culvert with 600mm HDPE with rip rap headwall.	Work zone is 10m on the East Side of the Drain. Level Spoil on East side. Allowance for damage.

Michener Drain

Property / Owner / Drain Side	From STA	To STA	Work Description	Access & Disposal
				Restore to cultivated field condition.
405600 PORT COLBORNE CITY Both Sides	1+649	1+170	Clean and Re-grade to Design Grade Line 1+649 to 1+170 BW=0.4m SS=1.5 TW=3.4m	Work zone is 10m on the East Side of the Drain. Level Spoil on East side. Restore to cultivated field condition. Allowance for damage.
ROW Friendship Trail	1+170	1+729	Existing Culvert to remain as is. Drain Ends north Side of Trail Crossing	Access to East work zone from Friendship Trail.

Michener Branch #1 Drain

Property / Owner / Drain Side	From STA	To STA	Work Description	Access & Disposal
404303 MASON MARTHA JEANNE Both Sides	0+000	0+085	Clean and re-grade to design grade line. BW = 0.4m SS = 1.5 TW = 1.5m	10m Work Zone is on the South Side Restore to pre-construction condition.
404700 WHISKEY RUN GOLF CLUB LTD North Side	0+085	0+217	Clean and re-grade to design grade line. BW = 0.4m SS = 1.5 TW = 1.5m	10m Work Zone is on the South Side – no impact
404400 LEON JOHN South Side	0+085	0+110	Clean and re-grade to design grade line. BW = 0.4m SS = 1.5 TW = 1.5m	10m Work Zone is on the South Side Restore to pre-construction condition.
404500 NICHOLLS LARRY JAMES South Side of Branch #1 with Branch #1 crossing from North to South.	0+110	0+302	67m Open Channel to be cleared of vegetation, cleaned to the design grade line. 0+177 Catchbasin (CB-01) with standard top grate; outlet to open channel with grate. Connect existing PE 150mm tile outlet to CB-01 (from sump pump) 0+178 to 0+302 Branch #1 PE 200mm Tile with filter sock below open channel drain with side slope 3:1 and BTW = 0.6m.	10m Work Zone for Branch #1 for 67m South side. North South Branch #1 Tile and channel is 10m Work Zone on East Side. Restore all to pre-construction condition.

Property / Owner / Drain Side	From STA	To STA	Work Description	Access & Disposal
Lakeshore Rd. East Right of Way	0+302	0+324.4	1 - CB-02 (OPSD 700.020) 0+128 & 0+145 200mm PE Tile crossing Lakeshore Rd. E and connect to CB-02 and CBDI-03 1 - CBDI-03 with OPSD 403.010 Existing culvert to remain as is.	Road Crossing to be backfilled with unshrinkable fill and restored to pre-construction condition with asphalt to City of Port Colborne Standards. Grade roadside swales to DICB.
400200 DOOLITTLE ROY W III From ROW - North Side	0+325	0+437	Buried 150mm PE Tile Drain on the ROW property line	City to grade roadside swale to CBDI-03 and CB-04. All work from Road allowance and restored to pre-construction condition.
Lakeshore Rd. East and Lorraine Rd. ROW.	0+437	0+437	1-CB-04 (OPSD 700.0.20) Catchbasin at SW corner of intersection. Top of grate set below edge of road.	City to grade roadside swale to CB-04.
Lakeshore Rd. East Right of Way.	0+437	0+458.6	Buried 150mm PE Tile Drain on the ROW property line. Backfill with U-shrink material under Road portion of ROW	City to restore road crossing.
404600 WINGER LLOYD JAMES JUNIOR From ROW - East side	0+458.36	0+505.5	DI-05Ditch Inlet with precast concrete headwall and grate.	City to grade roadside swale from Culvert CS-122 to Ditch Inlet @ 0.20%
400101 LEON LOU ANN South Side	0+000	0+018	Branch #1 Buried 150mm PE Tile Drain on the ROW property line	Branch #1 Work Zone is from the ROW. City to grade roadside swale. Restore all to pre-construction condition.
400102 WEEBADUARACHCHIGE ASELA South Side	0+018	0+51	Branch #1 Buried 150mm PE Tile Drain on the ROW property line	Branch #1 Work Zone is from the ROW. City to grade roadside swale. Restore all to pre-construction condition.
400400 MATHESON GARY South Side	0+051	0+60	Branch #1 Buried 150mm PE Tile Drain on the ROW property line Drain Ends with PE cleanout.	Branch #1 Work Zone is from the ROW. City to grade roadside swale. Restore all to pre-construction condition.

Michener Branch #2 Drain

Property / Owner	From STA	To STA	Work Description	Access & Disposal
405200 VALE CANADA LIMITED Both Sides	0+000	0+337.2	0+000 to 0+126 Clear Vegetation and re-grade to Design Grade Line. BW = .4m SS = 1.5 TW = 2.95m 0+126 to 0+180 Pond to remain as is. 0+180 to 0+232 Clear Vegetation and re-grade to Design Grade Line 0+232 to 0+337.2 Spot Tree Removal As Directed.	0+000 to 0+180 North Side 10m Work Zone. Spoil spread adjacent to drain. 0+180 to 0+232 West Side 10m Work Zone. Spoil spread adjacent to drain. 0+232 to 0+337.2 South Side Work Zone. Restoration to cultivated field condition.
Lorraine Rd. Right of Way	0+337.2	0+357.2	Existing Culvert to remain as is. City of Port Colborne responsible for maintenance.	

5 Drainage Works Financing

5.1 Cost of Works

As required by the Drainage Act, Chapter D.17, Section 59(1), Council may call a meeting if the contract price exceeds 133 percent of the estimated construction costs.

5.1.1 Admin & Engineering Costs

At present there are no Administration costs identified with the Michener Drain.

There are three primary engineering costs related to these works for the Michener Drain. There are costs from three separate engineering companies working to prepare the report.

Wiebe Engineering was first hired to prepare the report. Wiebe was paid $92,511.44 for work completed on the Wignell, Michener and Port Colborne Drains. A portion of this fee, allocated by area of the drain, is charged to the Michener Drain. (See Table 2 Drain Area Ratios)

Amec Foster Wheeler (formerly Amec and now Wood Plc) was appointed to conclude the report after Wiebe Engineering. They prepared a draft of the report, invoiced and were paid $67,147.23 but they did not finalize the report and ceased to work on the project.

These costs have been allocated to the respective drains using a drain area ratio as per the following table.

Table 2 Drain Area Ratios

Drain	Area, Ha	Area Ratio
Michener Drain Area	135	12.02%
Port Colborne Drain Area	345	30.78%
Wignell Drain Area	641	57.20%
Total:	**1121**	

The result is a cost allocation to Michener for the portion of engineering fees for each of the two previous engineers.

The fees for EWA Engineering Inc. are recorded for the fees in the preparation of each individual report.

5.1.2 Capital Construction Cost

The estimated cost of construction is shown in the following table.

Table 3 Michener Estimated Cost of Construction

	Sub-Total Costs	Total Cost
Michener Branch Drain #1	$30,271.50	
Michener Branch Drain #2	$3,325.00	
Michener Drain	$32,147.50	
Michener General Construction Costs	$14,968.00	
Michener Contingency	$13,148.80	
Estimated Cost of Construction		**$93,860.80**

5.2 Maintenance & Program Costs

Included in the estimated cost of construction are allocations for costs related to drain maintenance works including vegetation removal and re-grading.

The Michener Main Branch is a section 78 maintenance project to clean and re-grade to the established design grade line shown on the profile drawing, M.P1. The grade line is based on the AMEC survey of what is already in place for the existing culverts. This work is to be assessed according to the construction schedule prepared and shown as Table 8 Michener Drain Assessment Schedule of Costs

The Michener Branch #1 is a Section 4 drain improvement project to provide sufficient outlet for the Lorraine Rd. and Lakeshore Rd. culverts. The Lakeshore Rd. culvert becomes part of the drain, while the Lorraine Rd. culvert remains a roadway culvert. An allowance is made to landowners for the value of the existing drain channels.

The Michener Branch #2 is a Section 4 drainage petition by road authority to provide sufficient outlet for the Lorraine Rd. culvert, which remains a roadway culvert. An allowance is made to the landowner for the value of the existing drain channel. The pond will become part of the drain but is to remain as is.

5.3 Principles of Assessment

The following are general and specific principles used to assess costs for the Michener Drain according to the Regulations formed under the Drainage Act using our understanding of the Act and seeking the most fair methods to share costs to landowners within the Michener Drain Watershed.

1. Assessments are a method to calculate a contributing property's share of drainage works, hereafter referred to as a Drain.

2. Each Drain is defined by a fixed point of commencement that traverses to a fixed Outlet, which may be a receiver or another Drain.

3. A property contributes to a drainage work if any portion of the property contributes a runoff flow directly or indirectly to the Drain.

4. A Drain is any constructed or existing natural method of conveyance or stormwater management function that moves or controls water from one point of collection to a discharge point, an Outlet.

5. The use of a property; farming, residential, or vacant does not define benefit of the Drain. The benefit of a drain is realized equally among all properties with runoff to the Drain.

6. An excess or additional benefit is realized for any property or group of properties for which a higher standard of drainage service is required for the specific use of a property for which a higher value is realized.

As an example, where a market garden farm requires additional pumping for either irrigation or reducing the water surface in the drain, then the additional costs for that are borne by the benefitting lands.

7. Similarly, where a property or group of properties is provided with a lower standard of drainage service or where such property or properties provides a stormwater management function within the drainage works of the Drain, the value of the lower service or function is determined at a rate commensurate with the benefit to the drain.

As an example, where a property converts a portion of their lands (or the entire property) to a wetland or other stormwater management feature that reduces the peak flow of the runoff, thereby reducing or enhancing the capacity of the Drain to improve drainage and reduce flooding, then a commensurate benefit is realized to the volume of water removed from the runoff hydrograph.

Where the volume of detained runoff is small relative to the capacity of the drain, this contribution is deemed to be negligible. Where the volume detained is below 1% of the total runoff volume for the Drain, there is no real benefit realized for an individual Stormwater Management Feature.

8. The capacity of the Drain is determined based on a hydrologic model forecast of precipitation based runoff. Therefore each property realizes a drain benefit based on the proportion of predicted runoff for their property. Predicted runoff is a product of the following attributes, which are determined for each property:

a. Area contributing to runoff;
b. Land use as it relates to runoff;
c. Land topography;
d. Proportion of hard surfaces vs soft surfaces as they relate to infiltration; and
e. Stormwater management features specially built to reduce the rate of runoff.

9. A benefit is realized for a property that causes a physical change in the Drain works to serve a particular use or surface water benefit to the property.

An example of this is a culvert, which provides access to a property across a drain.

10. A benefit/assessment is realized for Municipal, Regional or Provincial lands held as Rights of Way that cause or require additional infrastructure, effort or costs related to the Drain. (Section 26)

11. Where a cost to the drain is realized through effort during construction or otherwise for the protection of flora, fauna or quantity, quality of stormwater runoff, this cost is born proportionally amongst all watershed contributing owners at the same rate as established for Drain benefit.

12. For the Michener Drain and the works being considered, a channel already exists and the proposed assessment is to recognize a service or benefit that already exists and is being confirmed to exist through an allowance under Section 31.

13. Utilities that require additional works, changes in design or protection during construction, those costs are borne by the owner of the utility.

While efforts within the drain design and assessment have been made to address water quality as well as quantity, there are limits within the Drainage Act. The following assessment table is proposed for using those regulations within the Drainage Act to address drainage works.

Benefit (Section 22)

This Assessment is based on the creation of land value through the creation of a new or additional drainage system. The Michener Drain works consists primarily of maintenance; cleaning and clearing.

For this reason, there is not a Benefit Assessment proposed on the main branch of the Michener Drain. However, for the two Branch Drains, a Section 22 benefit does exist and is recognized.

Outlet Liability (Section 23)

This is the primary basis for the assessment of the maintenance and drain works. Assessment is based on each individual property's contributing runoff. This is determined from the area flowing to the drain and from the runoff factor C. The runoff factor C is the Rational Method for predicting peak runoff and does not predict volume of runoff (note special benefit used for Site Specific SWM facilities).

The C factor for assessing property runoff is selected based on the property zoning. Where a property is not currently farmed but is zoned for farming, then a C factor is selected based on the potential use of the property. C factors are not adjusted for variations in Residential properties. Residential properties with or without buildings are assigned the same C factor. Thus, the C factor is not a current prediction of runoff for an individual property but a Factor to assess the

potential runoff based on the property's potential use in the present and in the future. The following Table of property codes will be used for the determination of C Factor values used in the Runoff Outlet Factor assessment.

PropCode	CATEGORY	DESCRIPTION	C-Factor Low	C-Factor High
100	LAND	Vacant residential land not on water	10	25
105	LAND	Vacant commercial land		
110	LAND	Vacant residential/recreational land on water		
200	FARM	Farm property without any buildings/structures	20	55
201	FARM	Farm with residence - with or without secondary structures; no farm outbuildings		
210	FARM	Farm without residence - with secondary structures; with farm outbuildings		
211	FARM	Farm with residence - with or without secondary structures; with farm outbuildings		
221	FARM	Farm with residence - with commercial/industrial operation		
228	FARM	Farm with gravel pit	12	50
230	FARM	Intensive farm operation - without residence	20	50
231	FARM	Intensive farm operation - with residence		
234	FARM	Large scale poultry operation	20	55
244	FARM	Managed forest property, residence not on water	20	30
260	FARM	Vacant residential/commercial/ industrial land owned by a non-farmer with a portion being farmed	20	55
261	FARM	Land owned by a non-farmer improved with a non-farm residence with a portion being farmed		
301	RESIDENTIAL	Single family detached (not on water)	15	40
302	RESIDENTIAL	More than one structure used for residential purposes with at least one of the structures occupied permanently		
303	RESIDENTIAL	Residence with a commercial unit		
313	RESIDENTIAL	Single family detached on water year round residence		
322	RESIDENTIAL	Semi-detached residence with both units under one ownership two residential homes sharing a common center wall.		
332	RESIDENTIAL	Typically a Duplex residential structure with two self-contained units.		
334	RESIDENTIAL	Residential property with four self-contained units		
383	RESIDENTIAL	Bed and breakfast establishment		
391	RESIDENTIAL	Seasonal/recreational dwelling - first tier on water		
392	RESIDENTIAL	Seasonal/recreational dwelling - second tier to water		
405	COMMERCIAL	Office use converted from house	20	65
410	COMMERCIAL	Retail - one storey, generally under 10,000 s.f.		
421	COMMERCIAL	Specialty automotive shop/auto repair/ collision service/car or truck wash		
441	COMMERCIAL	Tavern/public house/small hotel		
490	COMMERCIAL	Golf course	12	35
510	INDUSTRIAL	Heavy manufacturing (non-automotive)	45	85
518	INDUSTRIAL	Smelter/ore processing		
520	INDUSTRIAL	Standard industrial properties not specifically identified by other industrial Property Codes		
590	INDUSTRIAL	Water treatment/filtration/water towers/pumping station	*	*
593	INDUSTRIAL	Gravel pit, quarry, sand pit	*	*
597	INDUSTRIAL	Railway right-of-way	40	65
598	INDUSTRIAL	Railway buildings and lands described as assessable in the Assessment Act		
605	INSTITUTIONAL	School (elementary or secondary, including private)	35	50
702	SPECIAL PURPOSE	Cemetery	35	65

PropCode	CATEGORY	DESCRIPTION	C-Factor Low	C-Factor High
710	SPECIAL PURPOSE	Recreational sport club - non commercial (excludes golf clubs and ski resorts)	35	85
715	SPECIAL PURPOSE	Racetrack - auto	45	85
735	SPECIAL PURPOSE	Assembly hall, community hall	30	85
	ROW	Single lane Municipal Roadway	75	95
	ROW	unopened road allowance	65	85
	ROW	Regional or MTO	90	98

* C factor values are situationally assigned based on land use.

The following drain features are part of the whole system and are paid for through the outlet assessment:

- Channel Clearing and Re-grading
- Sediment Basins

In addition to assessed costs considered for special benefits, there is also recognition for stormwater management facilities within the watershed that reduce the peak flow used to determine the outlet assessment. These facilities that may already exist in the watershed and are recognized as having a benefit in the reduction of peak flow by determining the available volume is greater than the 24 hour peak flow volume predicted for the 1:100 year design storm.

- Site Specific Stormwater Management (SWM) Facilities
  - Wetlands,
  - Ponds, (natural and stormwater)
- Natural occurring features
  - Kettle lakes, and
  - Bog lands.
- Artificial runoff capture; such as Quarry lands or other features that collect runoff but do not outlet it to the Drain during the peak flow of the event.

Table 4 Section 23 Runoff Factor Determination - QRF Ratio

Area Ha	Soil Type	Gradient	Land Factor	Runoff Factor 'C'	QRF	SWM	SWMF	QRF-SWMF	QRF Ratio
2.176	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	COMMERCIAL	17	2.41	0	0	2.41	**0.1760**
1.201	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	15	1.18	0	0	1.18	**0.0857**
1.084	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	ROW - paved 2 lane	85	6.01	0	0	6.01	**0.4382**
0.848	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	15	0.83	0	0	0.83	**0.0605**
0.729	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	15	0.71	0	0	0.71	**0.0521**
0.560	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	15	0.55	0	0	0.55	**0.0400**
0.517	NM - Sandy well drained	0.20%	LAND	12	0.41	0	0	0.41	**0.0295**

QRF is a predicted runoff factor based on the following variables:

- Area, Ha – each property's connected area
- Runoff Factor 'C' – Coefficient of Runoff of generally accepted values
    - Soil Type – from Niagara Soil Report
    - Gradient – General Value from NPCA contours
    - Land Factor – reflects the impact of landuse on Runoff

QRF =0.0028* Runoff Factor 'C' * Avg Intensity mm/hr * Area, Ha

QRF-SWMF is the adjusted Runoff Factor used to represent the impact of owner implemented stormwater management facilities.

- SWM is the reduction achieved by the stormwater management facility as determined by the Drainage Engineer / Drainage Superintendent.
- SWMF is the reduction in QRF to be applied.
- QRF-SWMF = QRF - SWMF

QRF Ratio is QRF-SWMF divided by the Sum of all QRF-SWMF for each cost allocated area. The QRF Ratio is the value for each property contribution to the outlet liability cost as a portion of all other contributors.

QRF-SWMF and QRF Ratio is to be used for all future Maintenance assessments.

Special Benefit (Section 24)

The following are assessed costs considered special benefits:

- Culverts,
- Fording's,
- Closed Conduit conveyance (piped flow).

The cost of a culvert is assessed against the property owner based on the incremental cost of the drain. So a new culvert is paid for by the owner less the cost of drain construction on a per metre basis. The drain per metre construction cost will be estimated for the report but the actual cost will be used to calculate the final value.

The proposed closed conduit to provide an outlet for the Lorraine Rd. culvert crossing is assessed in the same manner, as an increase in costs above what would be realized for an open channel in the same location.

Culverts construction costs are shared between the land owner and the rest of the watershed on a 50/50 split basis. Construction costs are based on the City's typical design standard. Additional costs, headwalls, etc. are at the owners cost unless required by the Engineer to meet requirements.

Special Assessment (Section 26)

There are special assessments, as recognized under the Act, for public (not private) roads and utilities that have or require additional costs to the drainage system.

In addition to the projected assessments for Right of Way lands as determined by the outlet assessment, any other costs for road crossings or protection of utilities during construction are assessed to the road owner or utility owner.

An example is the Ditch Inlets proposed for construction on the Michener Branch Drain #1. Also in Michener Branch #1 is a $2,000 cost to protect or possibly move the gas line when the 200mm Tile crosses Lakeshore Rd. E. This cost is assigned to the utility owner, Enbridge.

These costs are additional effort during construction to protect or meet site supervision requirements by the utility. Also included are costs to move infrastructure, if required by site conditions. Actual costs will be assigned to the project as this is merely an estimate of costs during design.

5.3.1 Allowances:

1. Where a Drain assessment schedule already exists and a prior maintenance and assessment schedule is known to exist, then a Schedule 29 allowance is accepted and recognized through a past report and schedule unless it can be shown otherwise.

2. Where a Drain is re-aligned to a new path, then a Section 29 allowance for land taken is recognized. This can be amended by the restoration of any lands to the same owner by the same re-alignment. Thus, a net allowance can be recognized where that is shown to be the case.

3. Where previously no Drain was recognized but already existed as a flow path, then a Section 31 allowance can be realized along with a one time creation of a current and future easement for Drain maintenance activities as a Section 29 allowance. This is specifically for the creation of Branch Drains.

4. All property valuations are based on the same basic valuation, as per the Schedule of Costs.

5. Any tree or feature placed within a drainage works right of access for maintenance is not eligible for compensation in any form. Trees within the work zone are eligible for the 2 for 1 tree replacement program.

Section 29 Allowance
(One time payment for land taken)

Where a Drain already exists and has had maintenance in the past, then a work zone is assumed to already exist and a one time payment for the work zone easement has been made. No further payment for a work zone or easement is deemed to be required based on the pre-existing work zone regardless of whether that is known to exist or shown to exist in an explicit reference in a previous Engineer's report.

Where a Drain re-alignment or a Branch Drain is proposed, then a Section 29 allowance is determined. The determination is based on a 10m work zone running parallel to one side of the drain commencing at the Top of Bank. The side from which work is done is determined by the Drainage Engineer and shown on the Plans for Construction. In the case of a close conduit the work zone can be reduced to a 5m zone or a 10m zone with 5m on each side. The value is based on a single value of land figure as shown in the Schedule of Costs and because the access is intermittent with the owner retaining ownership and access / use of the land for farming or otherwise, then a factor in the assessment value of land is applied. Since the work zone is likely to be occupied on a 10 year cycle for maintenance a 1/10 factor is to be applied using the land purchase value.

Where a buffer is established that restricts use of the land adjacent to the drain in favour of permanent vegetation, then a full payment for land taken based on the value established is made. For a buffer, a registered easement on title is recommended.

Section 30 Allowance
(Payment for damages during construction)

This allowance is to compensate landowners for economic damages due to construction and recognizes two types of injury. Immediate loss of crop as a result of working corridor for construction and longer term damage to crops as a result of spoil spreading.

For the Michener Drain, we will award an allowance where work on the drain, such as maintenance, damages crops which can not be restored. Compensation in the form of an allowance does not apply to grass or any other ornamental feature that is restored to similar condition as existed pre-construction. Compensation is paid for the work zone width multiplied by the length affected at the rate of $4,300 per Hectare.

For any trees removed for construction that have a greater diameter than 150mm at breast height, (DBH) a compensation program of replacement saplings is proposed. Where a tree is removed and 2 trees of a variety native to the area are planted outside the work zone as compensation, then no award for damage is made.

A damage allowance for fences can be paid where the fence is not restored. In any of the planned work for the Michener Drain, fences are to be restored to a like or better condition and no allowance for payment is planned.

Section 31 Allowance
(Incorporate a Private Drain)

This type of allowance is to credit the construction effort of a private drain as it relates to the private drain being incorporated into a municipal drain.

This can be applied to the following:

• Michener Branch Drain #1 (portions) includes the open channel portion and the inclusion of the PE tile drain in the channel bottom.

• Michener Branch Drain #2.

The value of the private drain is dependent on condition and contribution to the function of the Drain. For valuation purposes, the cost to construct a similar channel would be made based on the Schedule of Prices. The cost to maintain it would be subtracted.

Section 32 Allowance
(Insufficient Outlet)

This provides compensation to affect owners for whom lands are not sufficiently drained by the service level provided by the Drain or where lands are discharged into instead of having a sufficient outlet.

There are no occurrences of this within the Michener Drain.

Section 33 Allowance
(Loss of Access)

Where a re-aligned Drain crosses property and cuts off access, an allowance can be granted. There are no known such occurrences.

5.3.2 General Instructions to Property Owners, Road Authorities and Public Utilities

The principles of the Drainage Act are:

- Drainage is a collective good that benefits all landowners. However, drainage doesn't have to benefit all landowners equally.
- All landowners cooperatively fund the drainage works proposed. There is no direct financial government role in the drainage works other than administrative.
- Landowners are assessed a financial share of the cost for the drainage works based on their respective drainage benefit.
- All drainage costs are born by landowners including allowances.
- Drainage is provided on the basis of an identified service level for a specified size of storm. The standard storm, 1 in 2 year frequency, for basic open channel design is 49.8mm over 24 hours. For a closed conduit design storm, the rational method is used for a peak capacity determined for a 121.1mm storm over 24 hours. A storm of a larger size or intensity

may cause flooding. Tile placed in the bottom of an open channel is provided for drainage and not conveyance.

For more details, refer to the Wignell Watershed Hydrology and Hydraulics Report.

A best effort has been made to compose a fair and reasonable assessment of costs to each portion of the contributing lands.

5.3.3 Grants

Owners of qualifying agricultural land are presently eligible for a grant of up to one-third of the cost of their assessment from the Ontario Ministry of Agriculture and Food. This grant would be applied for by the City of Port Colborne, and applied to the property owners' assessment at the time of final billing. The Assessment Schedule in Appendix C indicates lands provided by the municipality, qualify for the agricultural land use rebate. The final determination of eligibility is the decision of the Ontario Ministry of Agriculture and Food. To be eligible for a grant, the property owner must have a Farm Property Class Tax Rate or in combination with the Managed Forest Tax Incentive Program or the Conservation Land Tax Incentive Program for the lands to be drained by the Michener Drain.

For additional information on the Agricultural Drainage Infrastructure Program refer to the OMAFRA website at www.omafra.gov.on.ca.

5.4 Michener Drain Maintenance

From the Michener Outlet to the upstream limit of the drain at the Friendship Trail, basic drain maintenance is required. There is spot vegetation removal at the outlet to ensure a clear and free flowing discharge at the outlet but no re-grading is planned.

From 0+100 to 1+716, the existing grade needs to be checked and confirmed for matching the design grade and any high points removed. There are likely to be low points, which will remain. Vegetation removal is planned from 0+700 to 1+700. Work through the golf course is expected to be coordinated with the owner to reduce impact to the course.

Added to the cost of maintenance is the full engineering and administration costs less any costs directly assigned to specific Section 22, Section 24 benefit assessments.

With the Runoff Ratio, there is a Stormwater Management Facility reduction in Section 23 that can be applied for those properties that can demonstrate a runoff amendment structure that reduces peak flow contributions to the drain subject to evaluation and confirmation by the Drainage Superintendent and the Engineer.

For the purposes of the submission of the report, no SWMF assessments are recognized and the individual property owners can make a request for assessment and this will be recognized by the Engineer on project completion.

5.4.1 New Drain Crossings

The original bridge surveyed by AMEC on the golf course property was later changed to a 500mm CSP at some point and is to be replaced with a properly sized culvert at the landowner's expense.

A new farm access crossing is identified at 0+710 and is a combination crossing and sediment basin. The cost is of the crossing is 50% owner and 50% outlet benefit. The sediment basin is a cost shared among upstream landowners.

The existing crossing located at 1+615 is to be re-constructed on grade to ensure clear and free flowing inlet and outlet. The re-constructing of a new culvert is to be 50% owner and 50% outlet benefit.

5.4.2 Sediment Basins

The original sediment basin constructed south of the golf course is no longer visible as being an intact drainage structure. It will be reconstructed as part of the Drain Maintenance works in the location shown on the plans and as per the proposed Sediment Basin Standard drawings (M.GD-10).

The sediment basin associated with the crossing structure located at 0+710 is to be a modified version of the M.GD-10.

The cost of constructing sediment basins are shared among upstream landowners through a Section 23 assessment. However, the sediment basin on the golf course property was shown to exist in the Wiebe Drawing from November 15, 1996 and the reconstruction is 100% allocated to the Whiskey Run Golf Course as a Section 24 Special Benefit.

5.5 Allowance and Assessment Schedules

The Assessments calculations in Tables are included in Appendix C. The following sections provide a summary reporting of those calculations.

5.5.1 Drain Allowances

5.5.1.1 Michener Drain

The improvement of the Michener Drain using Section 78 is to perform drain maintenance using an updated schedule and to achieve enhanced stormwater management functions.

The channel will require an allowance under Section 29 for land taken as well as a work zone allowance for future access. The original land required for the drain is recognized by previous report and an assumed work zone of 5m. An additional 5m of work zone to a total of 10m is achieved through a Section 29 allowance based on purchase price of agricultural land as per the Schedule of Costs times the 1/10 ratio.

A section 30 allowance is recognized for the damage to crops during construction and is paid at the rate of $4,300 per hectare applied to the 10m work zone.

No other allowances are recognized for the maintenance of this existing drain.

Table 5 Michener Allowances

Drain	Section 29	Section 30	Section 31	Section 32	Section 33
Michener	$2,107.81	$1,253.69	$0.00	$0.00	$0.00
				Sub-Total of Allowances:	**$3,361.50**

Additional to these costs will be Administration and Engineering Costs related to the design.

5.5.1.2 Michener Branch Drain #1

As the drainage channel has existed and been providing drainage service since before 1934 when it is clearly visible in the aerial photograph, recognizing the channel with formal status under the drainage act ensures that future maintenance can be performed to ensure adequate outlet is realized for the upstream areas.

This existing channel should have been recognized in previous drain reports but may not have been established under the drainage act if deemed a private drain not crossing multiple properties. Since that time, several small properties have segregated the original property and recognition of the channel as a municipal drain under the Act is requested by the City of Port Colborne to recognize sufficient outlet for road drainage across properties. The branch drain is an addition to the existing drainage recognized through Section 4 of the Act as requested by the road authority for sufficient outlet.

The previous channel will require an allowance under Section 29 for land taken as well as a work zone allowance for future access. Additional allowance for the original cost of construction is also identified by the Act under Section 31, which is being awarded to current property owners when originally incurred by the agricultural property owner.

Table 6 Michener Branch #1 Allowances

Drain	Section 29	Section 30	Section 31	Section 32	Section 33
Michener Branch #1	$3,510.25	$0	$2,393.	$0	$0
				Sub-Total of Allowances:	**$ 5,903.25**

Additional to these costs will be Administration and Engineering Costs related to the design.

5.5.1.3 Michener Branch Drain #2

Existing channel services as an outlet for upstream area East of the Lorraine Rd. with a cross culvert identified as CS-101

Pond to remain as is without additional work or cleaning. Lower reach of the drain to be cleared of vegetation between banks and as required or needed to clear and clean to the design grade.

Allowance calculated for land taken and for the original cost of construction, valued today.

Table 7 Michener Branch #2 Allowances

Drain	Section 29	Section 30	Section 31	Section 32	Section 33
Michener Branch #2	$2,513.80	$1,621.10	$3,770.00	$0	$0
				Sub-Total of Allowances:	**$7,904.90**

Maintenance works for channel restoration are assessed across upstream landowners on a runoff factor basis, see Section 23.

No Section 30 allowance for damages to existing crops is anticipated for the work proposed.

5.5.2 Michener Drain Assessment Tables

The planned construction works for Michener and Branch Drains have been calculated and assessed as shown in the following 3 tables.

Table 8 Michener Drain Assessment Schedule of Costs

Michener Drain Assessment of Costs				Schedule Assessed Costs					
Owner	Legal Text	Roll No	Area	Benefit Section 22	Outlet Liability Section 23	Special Benefit Section 24	Total Assessment	Total Allowance	Net
DOOLITTLE ROY W III	PLAN 19 LOT 23 LOT 24 NP778	271104000314300	0.07	$0.00	$67.30	$0.00	$67.30	$0.00	$67.30
HANNAH ELISABETH WANLESS	PLAN 19 PT LOT 25 PT LOT 26;NP778	271104000314500	0.29	$0.00	$273.17	$0.00	$273.17	$0.00	$273.17
PYE LAURIE LYNNE	CON 1 PT LOT 19 PT LOT 20	271104000314600	12.37	$0.00	$11,703.24	$0.00	$11,703.24	$0.00	$11,703.24
BANKERT DAVID ROY	CON 1 PT LOT 19 RP 59R12136;PARTS 1 AND	271104000314700	3.87	$0.00	$3,664.77	$0.00	$3,664.77	$0.00	$3,664.77
VANDEBELD GRACE ELIZABETH	CON 1 PT LOT 19 PT LOT 20	271104000315000	5.16	$0.00	$5,156.99	$0.00	$5,156.99	$0.00	$5,156.99
HOCKLEY BRENDA LEE	CON 1 PT LOT 20	271104000317825	2.72	$0.00	$2,719.58	$0.00	$2,719.58	$0.00	$2,719.58
GRIST WILLIAM JOSEPH	CON 1 PT LOT 20 RP59R 11429;PART 1	271104000317850	0.41	$0.00	$405.81	$0.00	$405.81	$0.00	$405.81
VAN KRALINGEN ALLERT	CON 1 PT LOT 20	271104000317900	17.37	$0.00	$16,431.47	$0.00	$16,431.47	$0.00	$16,431.47
NERO FELICE	CON 1 PT LOT 20	271104000318000	2.43	$0.00	$1,971.61	$0.00	$1,971.61	$0.00	$1,971.61
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	5.12	$0.00	$3,874.95	$0.00	$3,874.95	$0.00	$3,874.95
NIEUWLAND LIEUWE CORNELIS	CON 1 PT LOT 20 RP 59R5493;PART 1	271104000318100	0.56	$0.00	$423.89	$0.00	$423.89	$0.00	$423.89
O'HARA GREGORY G	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400100	0.36	$0.00	$270.29	$0.00	$270.29	$0.00	$270.29
LEON LOU ANN	HUMBERSTONE CON 1 PT LOT 21;PT WATER LOT	271104000400101	0.53	$0.00	$402.79	$0.00	$402.79	$0.00	$402.79

Michener Drain Assessment of Costs				Schedule Assessed Costs					
Owner	Legal Text	Roll No	Area	Benefit Section 22	Outlet Liability Section 23	Special Benefit Section 24	Total Assessment	Total Allowance	Net
WEEBADUARACHCHIGE ASELA	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400102	0.51	$0.00	$443.04	$0.00	$443.04	$0.00	$443.04
DOOLITTLE ROY W III	CON 1 PT LOT 21	271104000400200	0.36	$0.00	$270.07	$0.00	$270.07	$0.00	$270.07
NEUMANN GARY	CON 1 PT LOT 21	271104000400300	0.38	$0.00	$672.86	$0.00	$672.86	$0.00	$672.86
FRAME JOHN DOUGLAS	CON 1 PT LOT 21 PLAN 59R;9880 PRTS 2 & 3	271104000400305	0.38	$0.00	$670.47	$0.00	$670.47	$0.00	$670.47
MATHESON GARY	CON 1 PT LOT 21	271104000400400	0.41	$0.00	$502.43	$0.00	$502.43	$0.00	$502.43
570466 ONTARIO LIMITED	HUMBERSTONE CON 1 PT LOT 22;RP 59R13926A	271104000404300	0.00	$0.00	$0.41	$0.00	$0.41	$0.00	$0.41
570466 ONTARIO LTD	CON 1 PT LOT 21	271104000404301	4.79	$0.00	$5,822.18	$0.00	$5,822.18	$0.00	$5,822.18
MASON MARTHA JEANNE	CON 1 PT LOT 21	271104000404303	3.07	$0.00	$3,730.03	$0.00	$3,730.03	$0.00	$3,730.03
LEON JOHN	CON 1 PT LOT 21	271104000404400	0.44	$0.00	$477.52	$0.00	$477.52	$0.00	$477.52
NICHOLLS LARRY JAMES	CON 1 PT LOT 21	271104000404500	1.22	$0.00	$1,154.45	$0.00	$1,154.45	$0.00	$1,154.45
WINGER LLOYD JAMES JUNIOR	CON 1 PT LOT 21	271104000404600	0.85	$0.00	$801.78	$0.00	$801.78	$0.00	$801.78
RIVANDO CHRISTOPHER ANTHONY	CON 1 PT LOT 21 PLAN 59R6790;PART 1	271104000404601	0.40	$0.00	$492.23	$0.00	$492.23	$0.00	$492.23
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 21 PT LOT 22 RP;59R8112 PAR	271104000404700	18.76	$0.00	$18,766.31	$4,110.00	$22,876.31	$0.00	$22,876.31
SPITERI CHARLES	CON 1 PT LOT 21	271104000404800	9.59	$0.00	$11,660.28	$1,250.00	$12,910.28	$0.00	$12,910.28
TALBOT JASON JONATHAN ARTHUR	CON 1 PT LOT 21	271104000404900	0.32	$0.00	$384.13	$0.00	$384.13	$0.00	$384.13
VALE CANADA LIMITED	CON 1 PT LOT 21 RP 59R9448;PART 1	271104000405000	0.35	$0.00	$422.55	$0.00	$422.55	$0.00	$422.55
VALE CANADA LIMITED	CON 1 PT LOT 21 PT LOT 22	271104000405100	10.51	$0.00	$12,788.68	$0.00	$12,788.68	$0.00	$12,788.68
VALE CANADA LIMITED	CON 1 PT LOT 21	271104000405200	7.76	$0.00	$7,756.27	$0.00	$7,756.27	$0.00	$7,756.27

Michener Drain Assessment of Costs				Schedule Assessed Costs					
Owner	Legal Text	Roll No	Area	Benefit Section 22	Outlet Liability Section 23	Special Benefit Section 24	Total Assessment	Total Allowance	Net
ARSENAULT ROBERT EUGENE	CON 1 PT LOT 21	271104000405300	0.24	$0.00	$236.25	$0.00	$236.25	$0.00	$236.25
NIEUWLAND LUKE	CON 1 PT LOT 21	271104000405400	0.34	$0.00	$340.10	$0.00	$340.10	$0.00	$340.10
ADAMS KEVIN JAMES	CON 1 PT LOT 21	271104000405500	9.20	$0.00	$9,205.38	$750.00	$9,955.38	$0.00	$9,955.38
PORT COLBORNE CITY	PT LOT 21 CON 1 RP 59R10301;PARTS 2 AND	271104000405600	2.30	$0.00	$2,299.86	$0.00	$2,299.86	$0.00	$2,299.86
PORT COLBORNE CITY	PT LOT 21 CON 1 RP 59R10301;PARTS 2 AND	271104000405600	2.03	$0.00	$2,026.41	$0.00	$2,026.41	$0.00	$2,026.41
MOSKALYK JOHN JOSEPH	CON 1 PT LOT 21	271104000405700	2.28	$0.00	$2,285.09	$0.00	$2,285.09	$0.00	$2,285.09
LEON LOU ANN	CON 1 PT LOT 21 RP 59R13013;PART 1	271104000417902	0.58	$0.00	$580.43	$0.00	$580.43	$0.00	$580.43
PORT COLBORNE CITY	CON 1 PT LOTS 1-22	271104000499900	1.60	$0.00	$1,599.13	$0.00	$1,599.13	$0.00	$1,599.13
PORT COLBORNE CITY	CON 1 PT LOTS 1-22	271104000499900	0.69	$0.00	$688.34	$0.00	$688.34	$0.00	$688.34
City of Port Colborne	Lorraine Rd. from Lake edge to Killaly St. East	Lorraine ROW	3.25	$0.00	$7,290.84	$0.00	$7,290.84	$0.00	$7,290.84
City of Port Colborne	Lakeshore Rd. East west of Lorraine	Lakeshore Rd. E ROW	0.56	$0.00	$1,277.26	$0.00	$1,277.26	$0.00	$1,277.26
City of Port Colborne	Weaver Rd. N of Friendship Trail	Weaver Rd. ROW	0.12	$0.00	$310.71	$0.00	$310.71	$0.00	$310.71
				$0.00	$142,321.33	$6,110.00	$148,431.33	$0.00	$148,431.33

Table 9 Michener Branch #1 Assessment Schedule of Costs

Michener Branch #1				Assessed Costs					
Owner	Legal Text	Roll No	Area	Benefit Section 22	Outlet Liability Section 23	Special Assessment Section 26	Total Assessment	Total Allowance	Net
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 21 PT LOT 22 RP;59R8112 PAR	271104000404700	2.176	$237.50	$6,096.20	$0.00	$6,333.70	$1,077.23	$5,256.47
NICHOLLS LARRY JAMES	CON 1 PT LOT 21	271104000404500	1.201	$975.00	$2,691.00	$0.00	$3,666.00	$2,842.74	$823.26
CofPC	Lakeshore Rd. East ROW	ROW	0.556	$535.00	$5,294.96	$6,590.43	$12,420.38	$0.00	$12,420.38
WINGER LLOYD JAMES JUNIOR	CON 1 PT LOT 21	271104000404600	0.848	$430.50	$1,424.32	$0.00	$1,854.82	$0.00	$1,854.82
MASON MARTHA JEANNE	CON 1 PT LOT 21	271104000404303	0.729	$200.00	$1,634.46	$0.00	$1,834.46	$1,590.74	$243.73
NIEUWLAND LIEUWE CORNELIS	CON 1 PT LOT 20 RP 59R5493;PART 1	271104000318100	0.560	$0.00	$1,255.02	$0.00	$1,255.02	$0.00	$1,255.02
LEON LOU ANN	CON 1 PT LOT 21 RP 59R13013;PART 1	271104000417902	0.517	$0.00	$695.64	$0.00	$695.64	$0.00	$695.64
RIVANDO CHRISTOPHER ANTHONY	CON 1 PT LOT 21 PLAN 59R6790;PART 1	271104000404601	0.405	$45.00	$680.10	$0.00	$725.10	$0.00	$725.10
DOOLITTLE ROY W III	CON 1 PT LOT 21	271104000400200	0.357	$280.00	$479.76	$0.00	$759.76	$0.00	$759.76
O'HARA GREGORY G	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400100	0.295	$0.00	$660.60	$0.00	$660.60	$0.00	$660.60
HANNAH ELISABETH WANLESS	PLAN 19 PT LOT 25 PT LOT 26;NP778	271104000314500	0.289	$0.00	$647.01	$0.00	$647.01	$0.00	$647.01
LEON JOHN	CON 1 PT LOT 21	271104000404400	0.205	$70.00	$459.96	$0.00	$529.96	$392.54	$137.42
WEEBADUARACHCHIGE ASELA	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400102	0.134	$82.50	$300.46	$0.00	$382.96	$0.00	$382.96
LEON LOU ANN	HUMBERSTONE CON 1 PT LOT 21;PT WATER LOT	271104000400101	0.122	$37.50	$272.75	$0.00	$310.25	$0.00	$310.25
DOOLITTLE ROY W III	PLAN 19 LOT 23 LOT 24 NP778	271104000314300	0.071	$150.00	$159.39	$0.00	$309.39	$0.00	$309.39
MATHESON GARY	CON 1 PT LOT 21	271104000400400	0.042	$22.50	$94.24	$0.00	$116.74	$0.00	$116.74

Michener Branch #1				Assessed Costs					
Owner	Legal Text	Roll No	Area	Benefit Section 22	Outlet Liability Section 23	Special Assessment Section 26	Total Assessment	Total Allowance	Net
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	0.012	$0.00	$33.13	$0.00	$33.13	$0.00	$33.13
NEUMANN GARY	CON 1 PT LOT 21	271104000400300	0.000	$0.00	$0.75	$0.00	$0.75	$0.00	$0.75
City of Port Colborne	Lorraine Rd. ROW	Lorraine Rd. ROW	0.689	$607.50	$6,947.53	$0.00	$7,555.03	$0.00	$7,555.03
Enbridge						$2,000.00	$2,000.00		$2,000.00
				$3,065.50	**$22,879.76**	**$8,590.43**	**$42,090.71**	**$5,903.25**	**$36,187.46**

Table 10 Michener Branch #2 Assessment Schedule of Costs

Owner	Legal Text	Roll No	Area	Benefit Section 22	Outlet Liability Section 23	Total Assessment	Total Allowance	Net
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	5.108	$0.00	$2,278.34	$2,278.34	$0.00	$2,278.34
PYE LAURIE LYNNE	CON 1 PT LOT 19 PT LOT 20	271104000314600	3.545	$0.00	$3,255.29	$3,255.29	$0.00	$3,255.29
VALE CANADA LIMITED	CON 1 PT LOT 21	271104000405200	2.799	$845.00	$2,570.32	$3,415.32	$7,904.90	-$4,489.58
NERO FELICE	CON 1 PT LOT 20	271104000318000	2.431	$0.00	$2,870.63	$2,870.63	$0.00	$2,870.63
VAN KRALINGEN ALLERT	CON 1 PT LOT 20	271104000317900	14.499	$0.00	$11,411.96	$11,411.96	$0.00	$11,411.96
City of Port Colborne	Lorraine Rd. ROW	Lorraine Rd. ROW	1.380	$4,000.00	$3,257.92	$7,257.92	$0.00	$7,257.92
VALE CANADA LIMITED	CON 1 PT LOT 21 PT LOT 22	271104000405100	0.554	$0.00	$407.12	$407.12	$0.00	$407.12
ARSENAULT ROBERT EUGENE	CON 1 PT LOT 21	271104000405300	0.154	$0.00	$181.95	$181.95	$0.00	$181.95
NIEUWLAND LUKE	CON 1 PT LOT 21	271104000405400	0.096	$0.00	$113.61	$113.61	$0.00	$113.61
BANKERT DAVID ROY	CON 1 PT LOT 19 RP 59R12136;PARTS 1 AND	271104000314700	0.075	$0.00	$59.15	$59.15	$0.00	$59.15
VALE CANADA LIMITED	CON 1 PT LOT 21 RP 59R9448;PART 1	271104000405000	0.058	$0.00	$42.93	$42.93	$0.00	$42.93
ADAMS KEVIN JAMES	CON 1 PT LOT 21	271104000405500	0.012	$0.00	$14.26	$14.26	$0.00	$14.26
				$4,845.00	$26,463.48	$31,308.48	**$7,904.90**	**$23,403.58**

5.5.3 Michener Drain Maintenance Schedules

The following are maintenance schedules for use with future maintenance work conducted in each of the Drain catchments.

5.5.3.1 Michener Drain Maintenance Schedule

The following is the Maintenance Assessment table for assigning future maintenance costs using Section 23, refer to Appendix C for the calculations.

Table 11 Michener Drain Maintenance Assessment Schedule

Owner	Legal Text	Roll No	Area Ha	QRF	SWM	SWMF	QRF-SWMF	QRF Ratio
DOOLITTLE ROY W III	PLAN 19 LOT 23 LOT 24 NP778	271104000314300	0.071	0.16	0	0	0.16	0.0005
HANNAH ELISABETH WANLESS	PLAN 19 PT LOT 25 PT LOT 26;NP778	271104000314500	0.289	0.66	0	0	0.66	0.0019
PYE LAURIE LYNNE	CON 1 PT LOT 19 PT LOT 20	271104000314600	12.371	28.25	0	0	28.25	0.0822
BANKERT DAVID ROY	CON 1 PT LOT 19 RP 59R12136;PARTS 1 AND	271104000314700	3.874	8.85	0	0	8.85	0.0257
VANDEBELD GRACE ELIZABETH	CON 1 PT LOT 19 PT LOT 20	271104000315000	5.156	12.45	0	0	12.45	0.0362
HOCKLEY BRENDA LEE	CON 1 PT LOT 20	271104000317825	2.719	6.56	0	0	6.56	0.0191
GRIST WILLIAM JOSEPH	CON 1 PT LOT 20 RP59R 11429;PART 1	271104000317850	0.406	0.98	0	0	0.98	0.0029
VAN KRALINGEN ALLERT	CON 1 PT LOT 20	271104000317900	17.369	39.66	0	0	39.66	0.1155
NERO FELICE	CON 1 PT LOT 20	271104000318000	2.431	4.76	0	0	4.76	0.0139
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	5.120	9.35	0	0	9.35	0.0272
NIEUWLAND LIEUWE CORNELIS	CON 1 PT LOT 20 RP 59R5493;PART 1	271104000318100	0.560	1.02	0	0	1.02	0.0030
O'HARA GREGORY G	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400100	0.357	0.65	0	0	0.65	0.0019
LEON LOU ANN	HUMBERSTONE CON 1 PT LOT 21;PT WATER LOT	271104000400101	0.532	0.97	0	0	0.97	0.0028
WEEBADUARACHCHIGE ASELA	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400102	0.512	1.07	0	0	1.07	0.0031
DOOLITTLE ROY W III	CON 1 PT LOT 21	271104000400200	0.357	0.65	0	0	0.65	0.0019
NEUMANN GARY	CON 1 PT LOT 21	271104000400300	0.383	1.62	0	0	1.62	0.0047
FRAME JOHN DOUGLAS	CON 1 PT LOT 21 PLAN 59R;9880 PRTS 2 & 3	271104000400305	0.382	1.62	0	0	1.62	0.0047
MATHESON GARY	CON 1 PT LOT 21	271104000400400	0.413	1.21	0	0	1.21	0.0035
570466 ONTARIO LIMITED	HUMBERSTONE CON 1 PT LOT 22;RP 59R13926A	271104000404300	0.000	0.00	0	0	0.00	0.0000
570466 ONTARIO LTD	CON 1 PT LOT 21	271104000404301	4.787	14.05	0	0	14.05	0.0409
MASON MARTHA JEANNE	CON 1 PT LOT 21	271104000404303	3.067	9.00	0	0	9.00	0.0262
LEON JOHN	CON 1 PT LOT 21	271104000404400	0.442	1.15	0	0	1.15	0.0034
NICHOLLS LARRY JAMES	CON 1 PT LOT 21	271104000404500	1.220	2.79	0	0	2.79	0.0081
WINGER LLOYD JAMES JUNIOR	CON 1 PT LOT 21	271104000404600	0.848	1.94	0	0	1.94	0.0056
RIVANDO CHRISTOPHER ANTHONY	CON 1 PT LOT 21 PLAN 59R6790;PART 1	271104000404601	0.405	1.19	0	0	1.19	0.0035
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 21 PT LOT 22 RP;59R8112 PAR	271104000404700	18.764	45.30	0	0	45.30	0.1319
SPITERI CHARLES	CON 1 PT LOT 21	271104000404800	9.586	28.14	0	0	28.14	0.0819

Owner	Legal Text	Roll No	Area Ha	QRF	SWM	SWMF	QRF-SWMF	QRF Ratio
TALBOT JASON JONATHAN ARTHUR	CON 1 PT LOT 21	271104000404900	0.316	0.93	0	0	0.93	0.0027
VALE CANADA LIMITED	CON 1 PT LOT 21 RP 59R9448;PART 1	271104000405000	0.347	1.02	0	0	1.02	0.0030
VALE CANADA LIMITED	CON 1 PT LOT 21 PT LOT 22	271104000405100	10.514	30.87	0	0	30.87	0.0899
VALE CANADA LIMITED	CON 1 PT LOT 21	271104000405200	7.756	18.72	0	0	18.72	0.0545
ARSENAULT ROBERT EUGENE	CON 1 PT LOT 21	271104000405300	0.236	0.57	0	0	0.57	0.0017
NIEUWLAND LUKE	CON 1 PT LOT 21	271104000405400	0.340	0.82	0	0	0.82	0.0024
ADAMS KEVIN JAMES	CON 1 PT LOT 21	271104000405500	9.204	22.22	0	0	22.22	0.0647
PORT COLBORNE CITY	PT LOT 21 CON 1 RP 59R10301;PARTS 2 AND	271104000405600	2.300	5.55	0	0	5.55	0.0162
PORT COLBORNE CITY	PT LOT 21 CON 1 RP 59R10301;PARTS 2 AND	271104000405600	2.026	4.89	0	0	4.89	0.0142
MOSKALYK JOHN JOSEPH	CON 1 PT LOT 21	271104000405700	2.285	5.52	0	0	5.52	0.0161
LEON LOU ANN	CON 1 PT LOT 21 RP 59R13013;PART 1	271104000417902	0.580	1.40	0	0	1.40	0.0041
PORT COLBORNE CITY	CON 1 PT LOTS 1-22	271104000499900	1.599	3.86	0	0	3.86	0.0112
PORT COLBORNE CITY	CON 1 PT LOTS 1-22	271104000499900	0.688	1.66	0	0	1.66	0.0048
City of Port Colborne	Lorraine Rd. from Lake edge to Killaly St. East	Lorraine ROW	3.250	17.60	0	0	17.60	0.0512
City of Port Colborne	Lakeshore Rd. East west of Lorraine	Lakeshore Rd. E ROW	0.563	3.08	0	0	3.08	0.0090
City of Port Colborne	Weaver Rd. N of Friendship Trail	Weaver Rd. ROW	0.121	0.75	0	0	0.75	0.0022
			134.55				343.51	1.0000

5.5.3.2 Michener Branch Drain #1 Maintenance Schedule

The following is the Maintenance Assessment table for assigning future maintenance costs using Section 23, refer to Appendix C for the calculations.

Table 12 Michener Branch Drain #1 Maintenance Schedule

Owner	Legal Text	Roll No	Area Ha	QRF	SWM	SWMF	QRF-SWMF	QRF Ratio
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 21 PT LOT 22 RP;59R8112 PAR	271104000404700	2.176	3.55	0	0	3.55	0.2044
NICHOLLS LARRY JAMES	CON 1 PT LOT 21	271104000404500	1.201	1.57	0	0	1.57	0.0902
City of Port Colborne	Lakeshore Rd. East ROW	ROW	0.556	3.08	0	0	3.08	0.1775
WINGER LLOYD JAMES JUNIOR	CON 1 PT LOT 21	271104000404600	0.848	0.83	0	0	0.83	0.0478
MASON MARTHA JEANNE	CON 1 PT LOT 21	271104000404303	0.729	0.95	0	0	0.95	0.0548
NIEUWLAND LIEUWE CORNELIS	CON 1 PT LOT 20 RP 59R5493;PART 1	271104000318100	0.560	0.73	0	0	0.73	0.0421
LEON LOU ANN	CON 1 PT LOT 21 RP 59R13013;PART 1	271104000417902	0.517	0.41	0	0	0.41	0.0233
RIVANDO CHRISTOPHER ANTHONY	CON 1 PT LOT 21 PLAN 59R6790;PART 1	271104000404601	0.405	0.40	0	0	0.40	0.0228
DOOLITTLE ROY W III	CON 1 PT LOT 21	271104000400200	0.357	0.28	0	0	0.28	0.0161
O'HARA GREGORY G	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400100	0.295	0.38	0	0	0.38	0.0221
HANNAH ELISABETH WANLESS	PLAN 19 PT LOT 25 PT LOT 26;NP778	271104000314500	0.289	0.38	0	0	0.38	0.0217
LEON JOHN	CON 1 PT LOT 21	271104000404400	0.205	0.27	0	0	0.27	0.0154
WEEBADUARACHCHIGE ASELA	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400102	0.134	0.17	0	0	0.17	0.0101
LEON LOU ANN	HUMBERSTONE CON 1 PT LOT 21;PT WATER LOT	271104000400101	0.122	0.16	0	0	0.16	0.0091
DOOLITTLE ROY W III	PLAN 19 LOT 23 LOT 24 NP778	271104000314300	0.071	0.09	0	0	0.09	0.0053
MATHESON GARY	CON 1 PT LOT 21	271104000400400	0.042	0.05	0	0	0.05	0.0032
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	0.012	0.02	0	0	0.02	0.0011
NEUMANN GARY	CON 1 PT LOT 21	271104000400300	0.000	0.00	0	0	0.00	0.0000
City of Port Colborne	ROW	Lorraine Rd. ROW	0.689	4.05	0	0	4.05	0.2329
			9.208	17.37	0.00	0.00	17.37	1.00

5.5.3.3 Michener Branch Drain #2 Maintenance Schedule

The following is the Maintenance Assessment table for assigning future maintenance costs using Section 23, refer to Appendix C for the calculations.

Table 13 Michener Branch Drain #2 Maintenance Schedule

Owner	Legal Text	Roll No	Area Ha	QRF	SWM	SWMF	QRF-SWMF	QRF Ratio
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	5.108	5.67	0	0	5.67	0.0885
PYE LAURIE LYNNE	CON 1 PT LOT 19 PT LOT 20	271104000314600	3.545	8.09	0	0	8.09	0.1264
VALE CANADA LIMITED	CON 1 PT LOT 21	271104000405200	2.799	8.22	0	0	8.22	0.1283
NERO FELICE	CON 1 PT LOT 20	271104000318000	2.431	3.17	0	0	3.17	0.0495
VAN KRALINGEN ALLERT	CON 1 PT LOT 20	271104000317900	14.499	28.38	0	0	28.38	0.4431
CofPC	ROW	Lorraine ROW	1.380	8.10	0	0	8.10	0.1265
VALE CANADA LIMITED	CON 1 PT LOT 21 PT LOT 22	271104000405100	0.554	1.01	0	0	1.01	0.0158
ARSENAULT ROBERT EUGENE	CON 1 PT LOT 21	271104000405300	0.154	0.25	0	0	0.25	0.0039
NIEUWLAND LUKE	CON 1 PT LOT 21	271104000405400	0.096	0.16	0	0	0.16	0.0025
BANKERT DAVID ROY	CON 1 PT LOT 19 RP 59R12136;PARTS 1 AND	271104000314700	0.075	0.15	0	0	0.15	0.0023
VALE CANADA LIMITED	CON 1 PT LOT 21 RP 59R9448;PART 1	271104000405000	0.058	0.11	0	0	0.11	0.0017
ADAMS KEVIN JAMES	CON 1 PT LOT 21	271104000405500	0.012	0.04	0	0	0.04	0.0006
City of Port Colborne	ROW	Weaver Rd. ROW	0.121	0.71	0.00	0.00	0.71	0.01
			30.833	64.05	0.00	0.00	64.05	1.00

6 Michener Drain Report Conclusions

This report has identified a series of drain improvements that include drain maintenance to ensure suitable channel design flows are achieved. The drain improvements have been developed through plan and profile drawings.

The following are summary descriptions of the planned improvements:

1. Spot Vegetation removal and basic maintenance at the outlet.

2. A specific program of improvement for the Michener Drain involving vegetation removal and re-grading to design grade line from 0+700 to 1+728.

3. An original private drain is to be converted to Michener Branch Drain #1 supplementing the existing roadway culvert on Lakeshore Rd. East and providing a suitable outlet for the culvert crossing Lorraine Rd. for the Section 4 petition by Road Authority. The cost of the bottom tile in channel swale and other improvements are shared with the City of Port Colborne, and the local benefitting landowners. The cost sharing is on a per metre basis for landowners and on the basis of area runoff as calculated. The Ditch Inlets and tile roadway crossing costs are 100% assigned to the City. An allowance is set aside for the possible construction impacts related to the gas line on Lakeshore Rd. E and such costs will be borne by the gas utility owner.

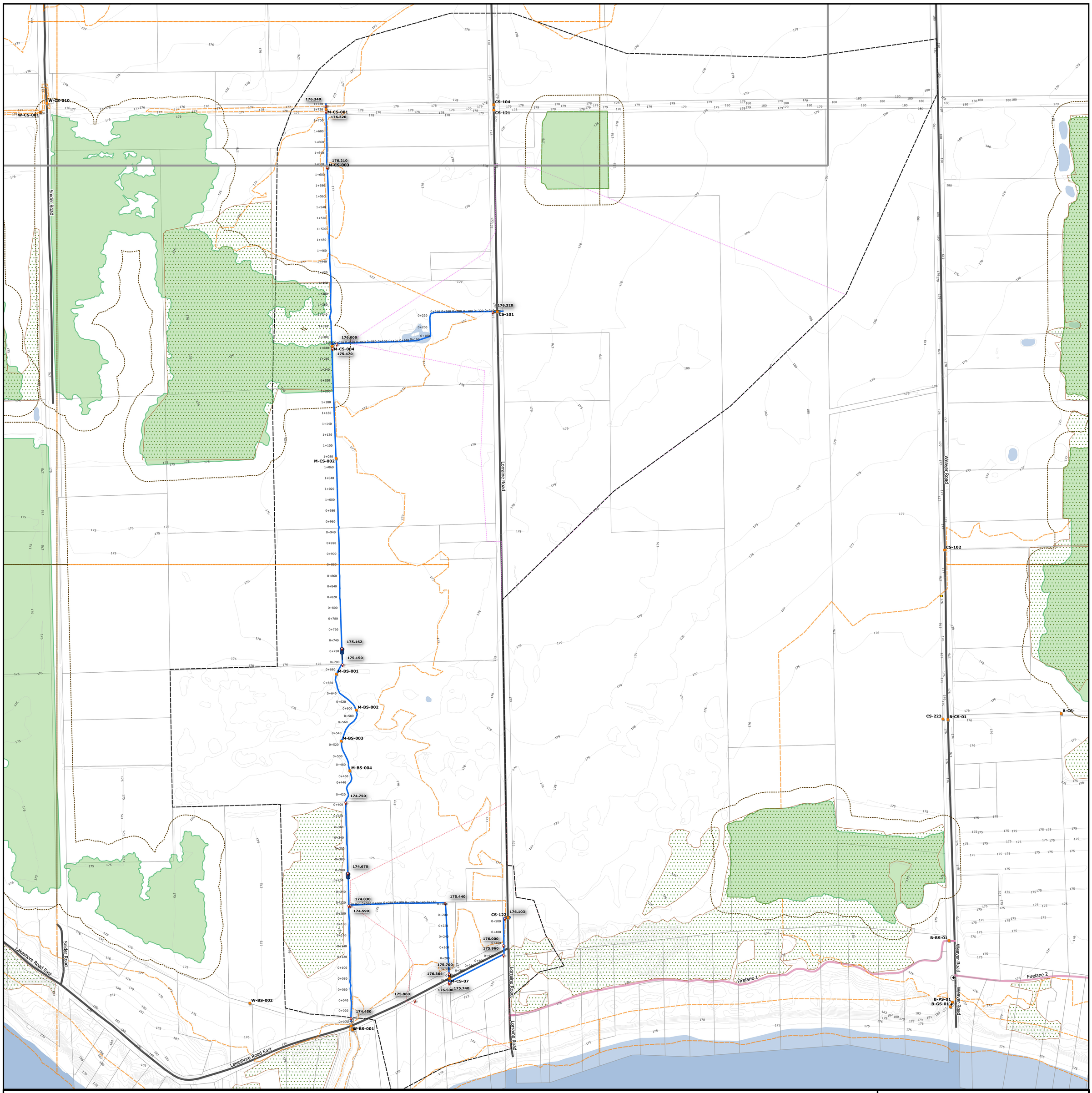
4. Inclusion of an original private drain as part of the Municipal Drain identified as Michener Branch Drain #2. This drain ensures the Lorraine Rd. Culvert CS-101 has a suitable outlet on the basis of a Section 4 Road Authority petition. Clearing and re-grading to design grade is planned west of the existing pond. Upstream of the pond minimal works is proposed except spot clearing of fallen trees impacting the newly identified Branch drain. No change is planned to the existing pond.

Construction of these works is to be recognized as a Section 29 allowance for land access, which has been assumed to already be in place for the main branch of the Michener for top width and a 5m allownance and is introduced for Branch #1 and Branch #2. Damages for construction, Section 30 allowances, are implemented for economic harm for crop damage from construction work impacts for farming properties only. All other construction impacts are to be restored to an equal or better condition.

Assessment is based on a shared benefit for the increased construction costs for the underground pipe works on Michener Branch #1 and allocated as a Section 22 adjacent benefit. Assessment for works related to Michener Branch #2 is Section 23 outlet benefit/liability. Assessment for the Michener Main Drain is based on Section 23 with special benefit assessed for new culvert works. The proposed new sediment basin is a Section 23 outlet liability benefit along with the overall construction costs.

This report and the proposed improvements are based on instructions from the City of Port Colborne and the local landowners. The cost of these improvements are shared across all areas that drain into the Drain by way of allowances and assessments consistent with the Drainage Act of Ontario.

Appendix A:
Plans, Profiles



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Michener Drain
Michener Branch #2

Michener Branch #1
rowculv
ALL_ASSESSMENT_PARCELS
All_Drain_Parcel_Roads
MUN
PRIV
IntegratedWaterbody

M.EP

Michener Drain

Environmental Plan

EWA Engineering Inc.
84 Main Street, Unionville, Ontario
L3R 2E7
647.400.2824 **www.ewaeng.com**

Printed on: 2020-01-30

$id	ARN_ABBREV	ARN	Owner	Area, Ha	Runoff Factor 'C'	QRF=0.0028CIA	SWMF Adjustment Factor	QRF-SWMF Adjusted	Michener QRF Ratio
0	405500	27110400405500	ADAMS KEVIN JAMES	9.20	37	22.22	0.00	22.22	0.0646
1	314600	27110400314600	PYE LAURIE LYNNE	12.37	35	28.25	0.00	28.25	0.0821
2	499900	27110400499900	PORT COLBORNE CITY	1.60	37	1.66	0.00	1.66	0.0048
3	317900	27110400317900	VAN KRALINGEN ALLERT	17.37	35	39.66	0.00	39.66	0.1152
4	405300	27110400405300	ARSENAULT ROBERT EUGENE	0.24	37	0.57	0.00	0.57	0.0017
5	317825	27110400317825	HOCKLEY BRENDA LEE	2.72	37	6.56	0.00	6.56	0.0191
6	405400	27110400405400	NIEUWLAND LUKE	0.34	37	0.82	0.00	0.82	0.0024
7	314700	27110400314700	BANKERT DAVID ROY	3.87	35	8.85	0.00	8.85	0.0257
8	317850	27110400317850	GRIST WILLIAM JOSEPH	0.41	37	0.98	0.00	0.98	0.0028
9	405700	27110400405700	MOSKALYK JOHN JOSEPH	2.28	37	5.52	0.00	5.52	0.0160
10	405600	27110400405600	PORT COLBORNE CITY	2.30	37	4.89	0.00	4.89	0.0142
11	405200	27110400405200	VALE CANADA LIMITED	7.76	37	18.72	0.00	18.72	0.0544
12	315000	27110400315000	VANDEBELD GRACE ELIZABETH	5.16	37	12.45	0.00	12.45	0.0362
13	405600	27110400405600	PORT COLBORNE CITY	2.03	37	4.89	0.00	4.89	0.0142
14	499900	27110400499900	PORT COLBORNE CITY	0.69	37	1.66	0.00	1.66	0.0048
15	318000	27110400318000	NERO FELICE	2.43	30	4.76	0.00	4.76	0.0138
16	405100	27110400405100	VALE CANADA LIMITED	10.51	45	30.87	0.00	30.87	0.0897
17	404800	27110400404800	SPITERI CHARLES	9.59	45	28.14	0.00	28.14	0.0818
18	405000	27110400405000	VALE CANADA LIMITED	0.35	45	1.02	0.00	1.02	0.0030
19	404900	27110400404900	TALBOT JASON JONATHAN ARTHUR	0.32	45	0.93	0.00	0.93	0.0027
20	318010	27110400318010	WHISKEY RUN GOLF CLUB LTD	5.12	28	9.35	0.00	9.35	0.0272
21	404700	27110400404700	WHISKEY RUN GOLF CLUB LTD	18.76	37	45.30	0.00	45.30	0.1316
22	404303	27110400404303	MASON MARTHA JEANNE	3.07	45	9.00	0.00	9.00	0.0262
23	404601	27110400404601	RIVANDO CHRISTOPHER ANTHONY	0.40	45	1.19	0.00	1.19	0.0035
24	404301	27110400404301	570466 ONTARIO LTD	4.79	45	14.05	0.00	14.05	0.0408
25	400101	27110400400101	LEON LOU ANN	0.53	28	0.97	0.00	0.97	0.0028
26	400305	27110400400305	FRAME JOHN DOUGLAS	0.38	65	1.62	0.00	1.62	0.0047
27	314300	27110400314300	DOOLITTLE ROY W III	0.07	35	0.16	0.00	0.16	0.0005
28	318100	27110400318100	NIEUWLAND LIEUWE CORNELIS	0.56	28	1.02	0.00	1.02	0.0030
29	400100	27110400400100	O'HARA GREGORY G	0.36	28	0.65	0.00	0.65	0.0019
30	400102	27110400400102	WEEBADUARACHCHIGE ASELA	0.51	32	1.07	0.00	1.07	0.0031
31	400300	27110400400300	NEUMANN GARY	0.38	65	1.62	0.00	1.62	0.0047
32	417902	27110400417902	LEON LOU ANN	0.58	37	1.40	0.00	1.40	0.0041
33	404500	27110400404500	NICHOLLS LARRY JAMES	1.22	35	2.79	0.00	2.79	0.0081
34	400200	27110400400200	DOOLITTLE ROY W III	0.36	28	0.65	0.00	0.65	0.0019
35	314500	27110400314500	HANNAH ELISABETH WANLESS	0.29	35	0.66	0.00	0.66	0.0019
36	404400	27110400404400	LEON JOHN	0.44	40	1.15	0.00	1.15	0.0033
37	404600	27110400404600	WINGER LLOYD JAMES JUNIOR	0.85	35	1.94	0.00	1.94	0.0056
38	400400	27110400400400	MATHESON GARY	0.41	45	1.21	0.00	1.21	0.0035

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Michener Drain
Michener Branch #2
Michener Branch #1
Mich_prop
All_Drain_Parcel_Roads
MUN
PRIV

100 0 100 200 300 400 m

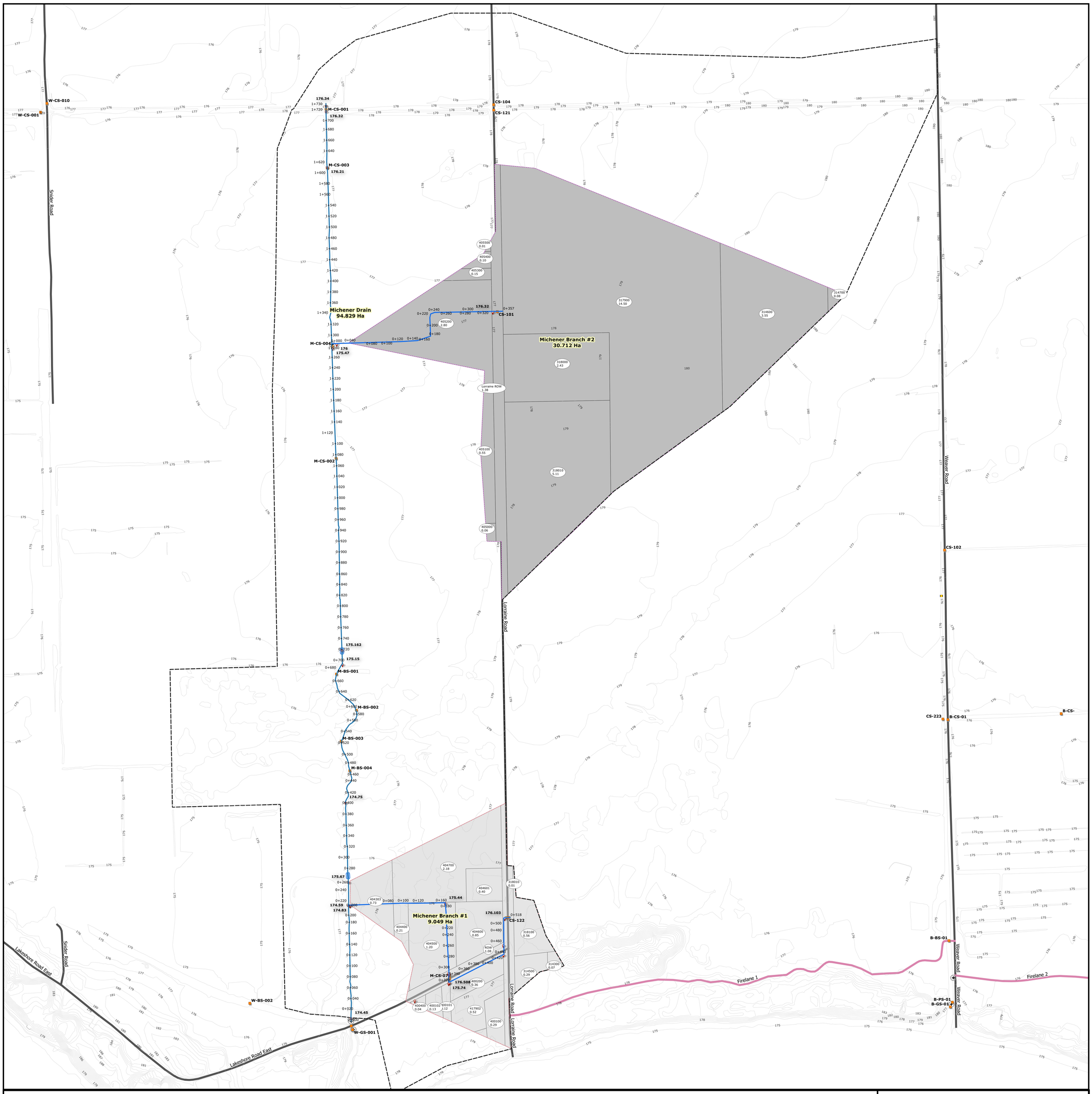
Map Scale 1:2500

Michener Drain

Assessed Properties by Drainage Area and ARN

EWA Engineering Inc.
84 Main Street, Unionville, Ontario
L3R 2E7
647.400.2824 www.ewaeng.com

Printed on: 2020-03-30



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- PRIV

[id]

Michener Drain

Assessed Properties by Drainage Area and ARN

EWA Engineering Inc.
84 Main Street, Unionville, Ontario
L3R 2E7
647.400.2824 www.ewaeng.com

Printed on: 2020-01-27

MICHENER DRAIN

MICHENER DRAIN END
STA 1+727.29
N 4749849.162
E 645495.423
Z 176.36

M-CS-001
ConcBox 3000x1200

600mmø CSP
CULVERTS (2)

M-CS-003
450mmø CSP

REPLACE EX. CSP WITH 6m 500mmØ DOUBLE WALL HDPE CULVERT WITH RIP-RAP AS PER GD-05

REMOVE VEGETATION AND RE-GRADE CHANNEL 315m

REMOVE VEGETATION AND RE-GRADE CHANNEL, POND TO REMAIN AS IS

SPOT REMOVE AS DIRECTED REMOVE TREE FALL RESTORE CHANNEL

EX. CS-101
450mmø CSP

SPOT REMOVE TREES WITHIN BANKS AS DIRECTED BY DRAINAGE SUPERINTENDENT 195m

M-CS-004
900mmø CSP

POND

PROPOSED BRANCH DRAIN #2, SEE DWG M.SD-04

REMOVE VEGETATION AND RE-GRADE CHANNEL 500m

M-CS-002
ConcBox

TEMP. FORDING

EX. CULVERT/BRIDGE TO BE REMOVED

CONSTRUCT SEDIMENT CONTROL BERM & FARM CROSSING (SEE M.SD-03b)

REPLACE EX. CULVERT WITH 750mmØ HDPE CULVERT (SEE GD-05)

RE-GRADE TO DESIGN 437m

M-BS-001
Bridge

M-BS-002
EX. 500mmø CSP

M-BS-003
Bridge

M-BS-004
Bridge

0+260 SEDIMENT CONTROL BASIN. (SEE M.SD-03a) CONSTRUCT PRIOR TO UPSTREAM WORK.

WRGC IRRIGATION POND

REMOVE VEGETATION AND RE-GRADE CHANNEL 175m

PROPOSED BRANCH DRAIN #1, SEE DWG M.SD-01, M.SD-02, AND M.SD-03

100mmø CI PIPE W/ CONTROL VALVE

CONSTRUCT 147m SWALE BW=1m SS=3 TW=3m 200mm PERF PE TILE BELOW SWALE WITH CB AND DICB

WRGC IRRIGATION POND

WRGC POND 2

450mmø CSP CULVERT

CONSTRUCT 20m OF 200mm TILE WITH CB AND CONCRETE HEADWALL. CITY TO REGRADE ALL ROAD SWALES.

SPOT REMOVE TREES AND VEGETATION TO MICHENER OUTLET AS DIRECTED

WRGC PUMP

WRGC POND 1

EX. 400mmø CULVERT INSTALLED BY CofPC, 2017 (TO REMAIN)

CONSTRUCT 60m OF 150mm PE TILE AND 112m OF 200mm TILE WITH CLEAN OUT, CB, AND DICB. CITY TO REGRADE ALL ROAD SWALES.

OUTLETS TO WIGNELL DRAIN

MICHENER BENCHMARK
0+000 MICHENER DRAIN – NO PHYSICAL BENCHMARK AVAILABLE
℄ OF MICHENER OUTLET TO WIGNELL DRAIN
N 4748158.624
E 645541.912
Z 174.47

LORRAINE ROAD

LAKESHORE ROAD EAST

BEAVERDAM DRAIN

0 250m 500m

NOTES:

1. DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED
2. CATCHMENT BOUNDARIES ARE BASED ON THE NPCA DIGITAL ELEVATION MODEL (DEM) 2010
3. SPECIFIC POINTS IN THE SURFACE ARE BASED ON THE FOLLOWING SURVEYS:
   - DRAIN CROSSINGS & SPOT CHANNELS AMEC SURVEY, 2013
   - AS CONSTRUCTED SURVEY BY CofPC, 2016 STATION 0+000–1+940
   - SUPPLEMENTARY SURVEY BY CofPC, 2018
   - WEIBE ENGINEERING SURVEY, 2008

PLAN VIEW LEGEND:

- DRAINAGE AREA BOUNDARY
- SUB–DRAINAGE AREA BOUNDARY
- DRAIN CENTERLINE
- PROPOSED DRAIN CENTERLINE
- 0+000 DRAIN CHAINAGE
- X.SD-02 SITE SPECIFIC DETAIL I.D.
- BOUNDARY OF AREA CAPTURED IN SITE DETAIL
- DRAINAGE WORK PROPOSED
- *DRAINAGE WORK COMPLETED – TO BE ASSESSED*

LICENSED PROFESSIONAL ENGINEER
PAUL C MARSH
04/14/2020
PROVINCE OF ONTARIO

NO.	REVISION DESCRIPTION	DATE
1	ISSUED FOR REPORT	April 15, 2020

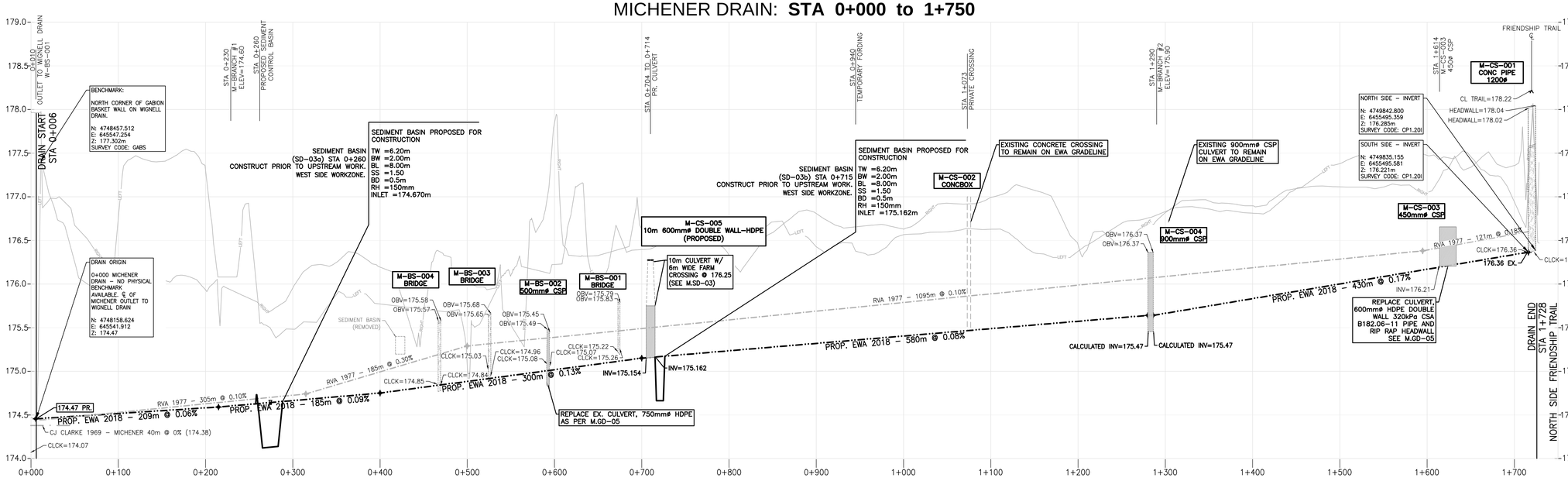
MICHENER DRAIN PLAN

Paul C. Marsh, P.Eng. Principal Engineer
EWA Engineering Inc.
84 Main Street, Unionville, Ontario
L3R 2E7
647.400.2824 **www.ewaeng.com**

City of Port Colborne

Michener Municipal Drain

DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
DAC	PCM	183927	M.PLAN
DESIGNED BY :	DATE :	SCALE :	
PCM	14–Apr–20	F.T.P.	



MICHENER DRAIN: **STA 0+000 to 1+750**

NOTES:

1. DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED
2. CATCHMENT BOUNDARIES ARE BASED ON THE NPCA DIGITAL ELEVATION MODEL (DEM) 2010
3. SPECIFIC POINTS IN THE SURFACE ARE BASED ON THE FOLLOWING SURVEYS:
   - DRAIN CROSSINGS & SPOT CHANNELS AMEC SURVEY, 2013
   - AS CONSTRUCTED SURVEY BY CofPC, 2016 STATION 0+000–1+940
   - SUPPLEMENTARY SURVEY BY CofPC, 2018
   - WEIBE ENGINEERING SURVEY, 2008

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE DONE TO THEM.

SPATIAL DATA:

DTM DATA FROM NIAGARA PENINSULA CONSERVATION AUTHORITY

- HORIZONTAL DATUM: UTM NAD83–CSRS ZONE 17N
- VERTICAL DATUM: CGVD28–1978
- ACCURACY: ABSOLUTE HORIZONTAL AND VERTICAL POSITIONAL ACCURACIES OF ±0.5m

LEGEND

—·—·—·—·—	EXISTING DITCH BOTTOM (NPCA DEM DATA)
·–·✕·–·–·✕·–·	EXISTING DITCH BOTTOM (SURVEYED)
—·—·—·—	HISTORICAL GRADELINE
—··—··✕··—··—	PROPOSED DRAIN GRADELINE–EWA, 2018
——LEFT——	LEFT BANK
——RIGHT——	RIGHT BANK
————	EXISTING DRAIN SECTION
——/▬▬	EXISTING STRUCTURE DETAILS
– – –/▬ ▬	ASSUMED EXISTING STRUCTURE DETAILS
OBV=175.00	EXISTING DRAIN ELEVATION
175.00 PR.	PROPOSED DRAIN CENTERLINE ELEVATION
175.00 EX.	PORPOSED DRAIN ELEVATION (WHERE MATCHES EXISTING ELEVATION)
·—·—✕—·—·	DATA POINT FROM HISTORICAL DESIGN GRADELINE RVA, 1979

NO.	REVISION DESCRIPTION	DATE
1	ISSUED FOR BASELINE REPORT	April 15, 2020

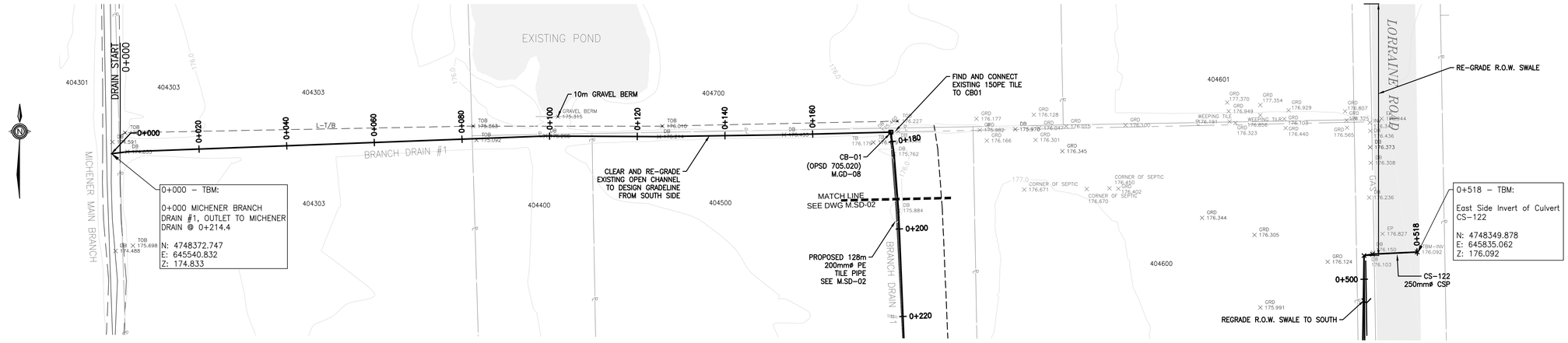
MICHENER MUNICIPAL DRAIN PROFILE

PAUL C MARSH
04/14/2020

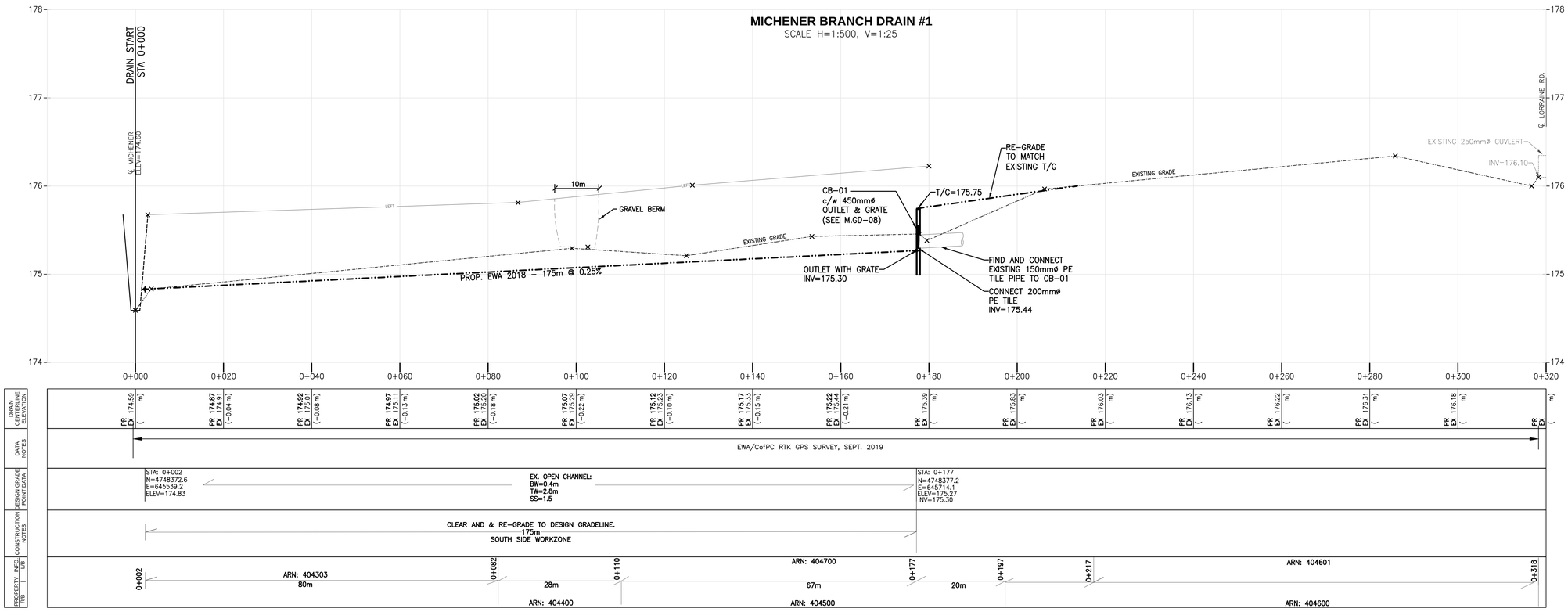
CITY OF
PORT COLBORNE

Paul C. Marsh, P.Eng. Principal Engineer
EWA Engineering Inc.
84 Main Street, Unionville, Ontario
L3R 2E7
647.400.2824
www.ewaeng.com

DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
DAC	PCM	–	M.P1
DESIGNED BY :	**DATE :**	**SCALE :**	
PCM	14–Apr–20	H=1:2500 V=1:25	



PLAN VIEW
SCALE 1:500



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LEGEND

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	EXISTING DITCH BOTTOM (SURVEYED)
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	PROPOSED DRAIN GRADELINE–EWA, 2018
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NO.	REVISION DESCRIPTION	DATE
1	ISSUED FOR REPORT	April 15, 2020

LICENSED PROFESSIONAL ENGINEER
PAUL C. MARSH
04/14/2020
PROVINCE OF ONTARIO

MICHENER MUNICIPAL DRAIN SPECIFIC DETAIL

CITY OF PORT COLBORNE

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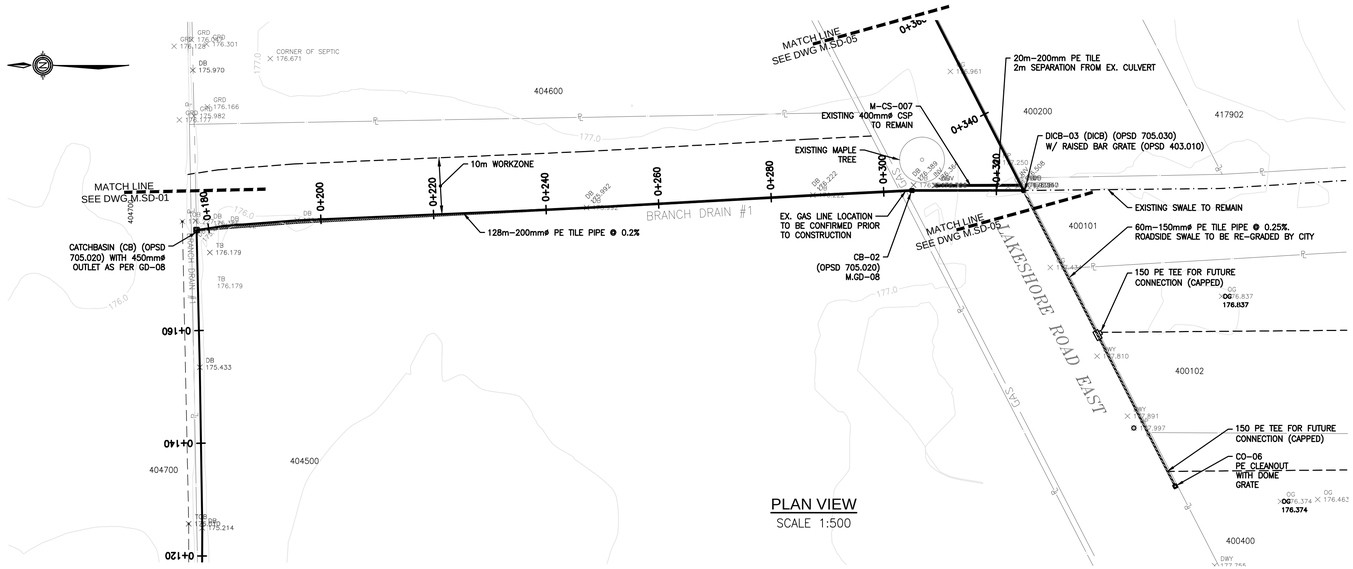
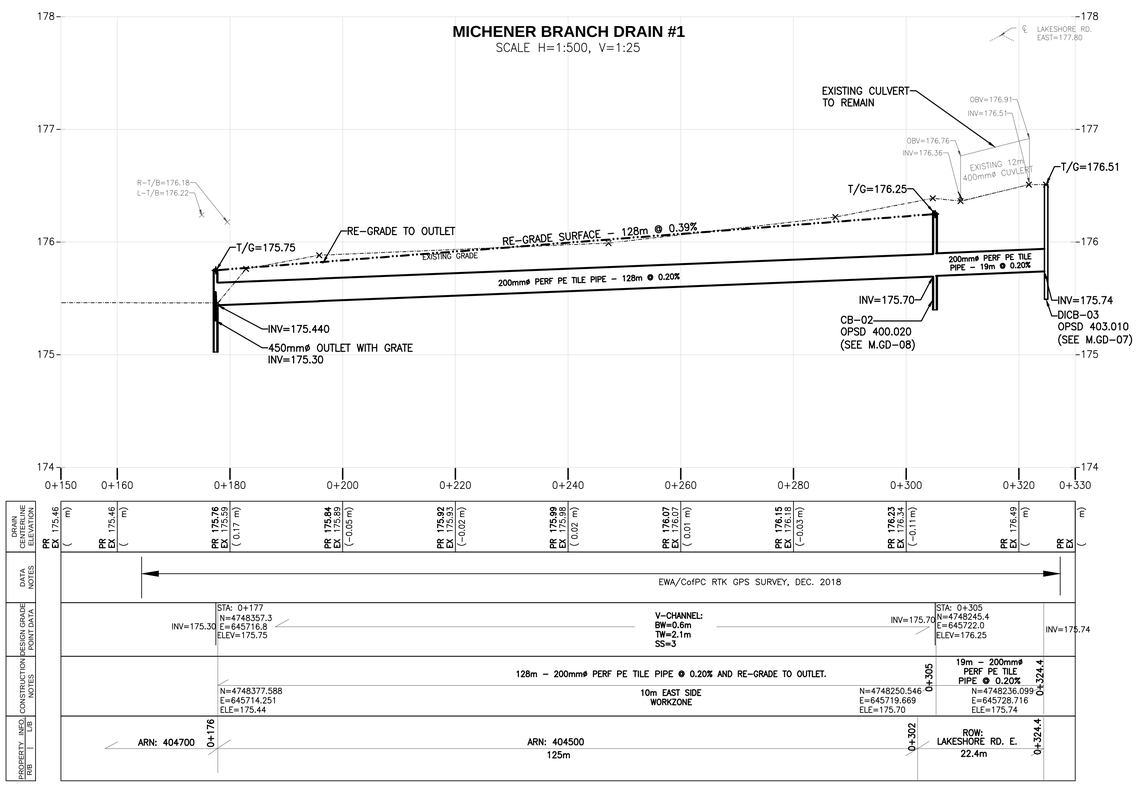
DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
DAC	PCM	189399	M.SD–01
DESIGNED BY :	DATE :	SCALE :	
PCM	14–Apr–20	AS SHOWN	



PLAN VIEW
SCALE 1:500



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	DATA POINT FROM HISTORICAL DESIGN GRADELINE RVA, 1979

NO.	REVISION DESCRIPTION	DATE
1	ISSUED FOR REPORT	April 15, 2020

LICENSED PROFESSIONAL ENGINEER
PAUL C MARSH
04/14/2020
PROVINCE OF ONTARIO

MICHENER MUNICIPAL DRAIN SPECIFIC DETAIL

CITY OF PORT COLBORNE

PORT COLBORNE
Paul C. Marsh, P.Eng. Principal Engineer
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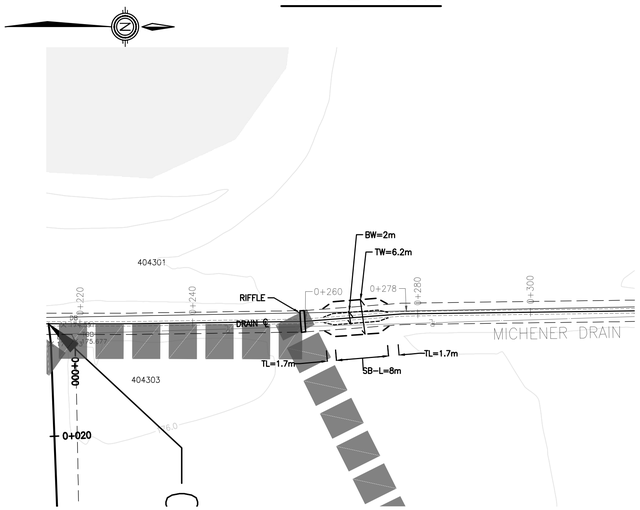
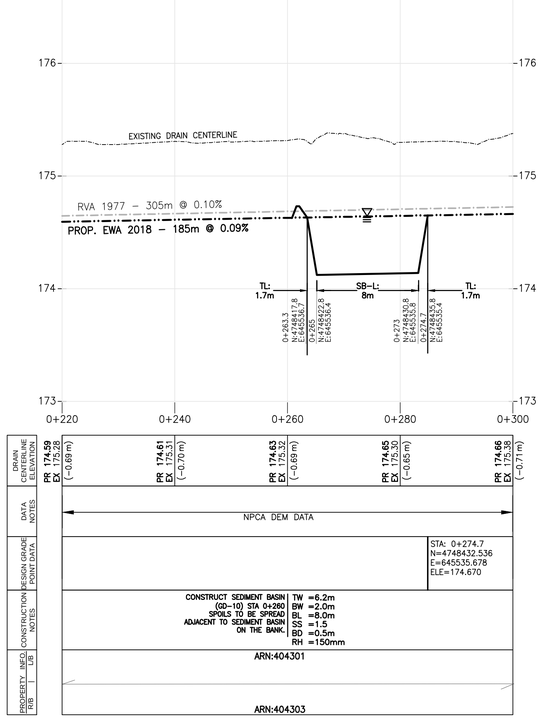
647.400.2824 **www.ewaeng.com**

DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
DAC	PCM	189399	M.SD-02
DESIGNED BY :	DATE :	SCALE :	
PCM	14-Apr-20	AS SHOWN	

M.SD-03a

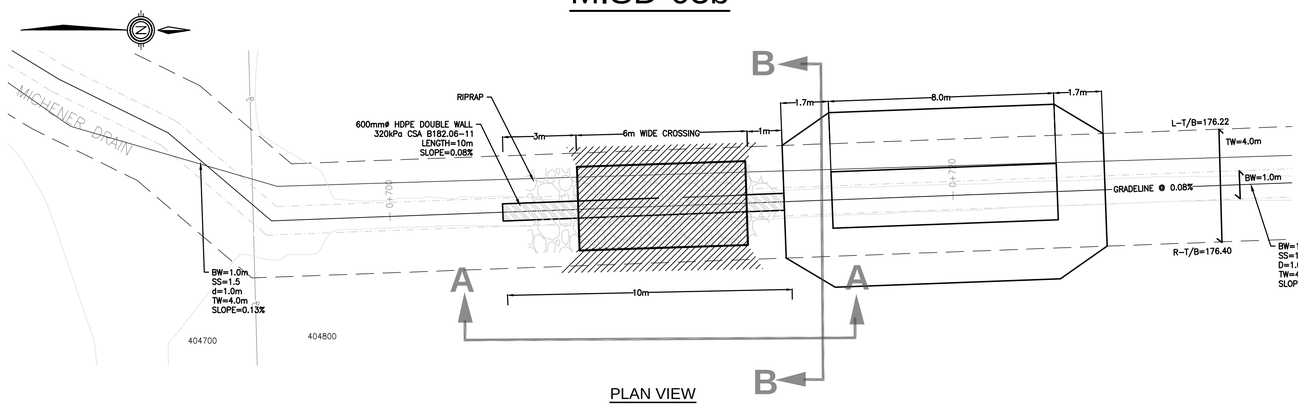


PLAN VIEW
SCALE 1:500

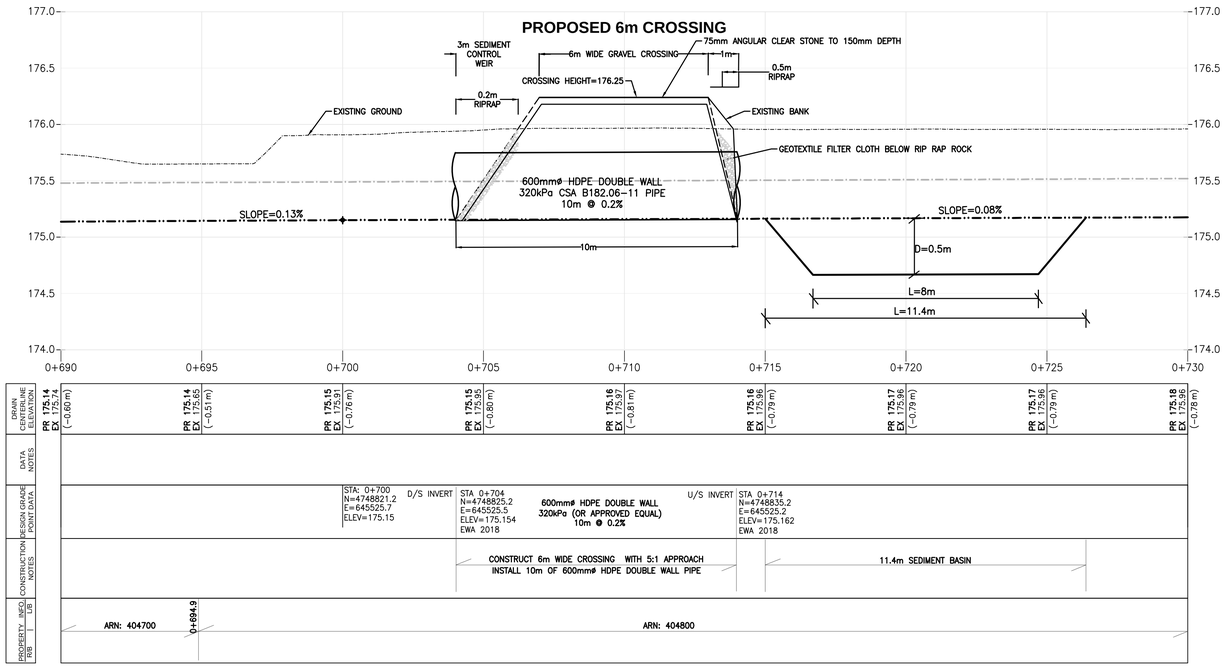


PROFILE VIEW
SCALE H=1:500, V=1:25

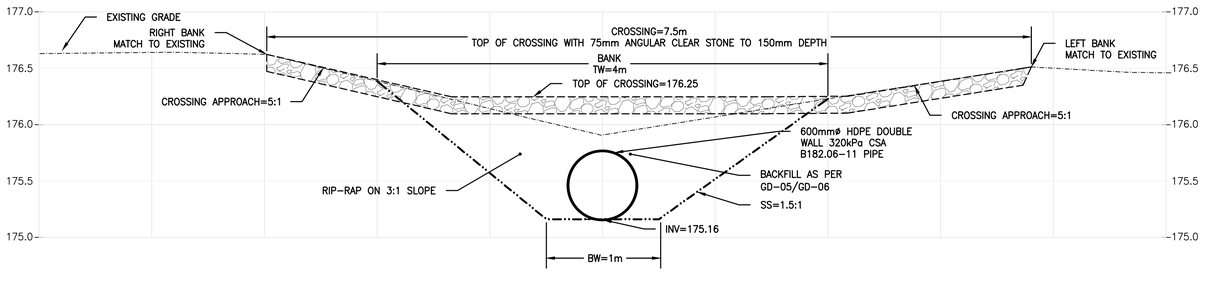
M.SD-03b



PLAN VIEW
SCALE 1:100



SECTION A-A
SCALE H=1:100, V=1:25



SECTION B-B
SCALE 1:25

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NO.	REVISION DESCRIPTION	DATE
1	ISSUED FOR REPORT	April 15, 2020

LICENSED PROFESSIONAL ENGINEER
PAUL C MARSH
04/14/2020
PROVINCE OF ONTARIO

MICHENER MUNICIPAL DRAIN SPECIFIC DETAIL

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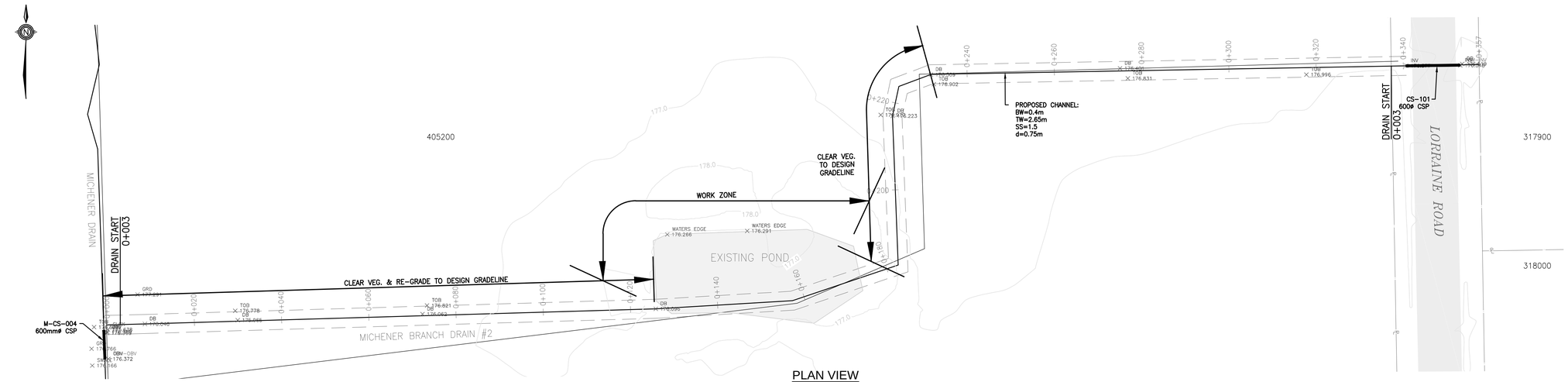
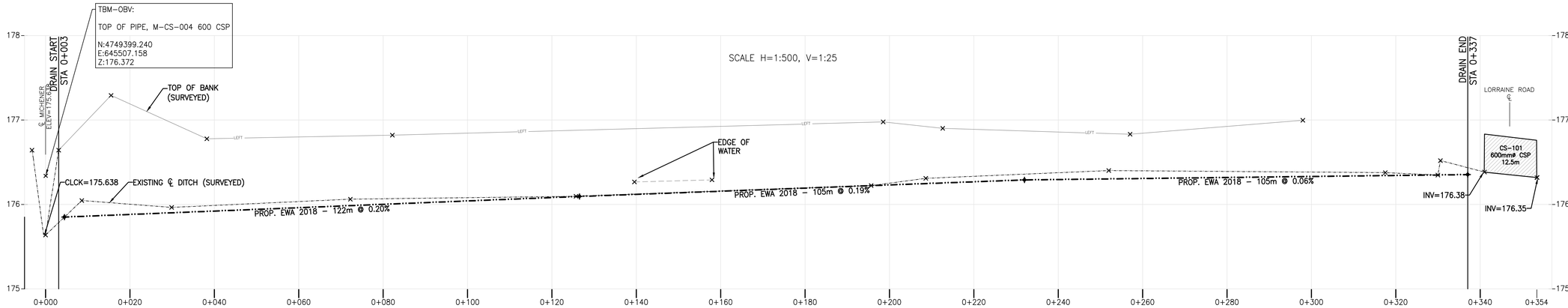
DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
DAC	PCM	189399	M.SD-03
DESIGNED BY :	DATE :	SCALE :	
PCM	14-Apr-20	N/A	



PLAN VIEW
SCALE 1:500



	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220	0+240	0+260	0+280	0+300	0+320	0+340	0+354
DRAIN CENTERLINE ELEVATION	PR EX. 175.64 m	PR 175.88 EX. 176.00 (−0.12 m)	PR 175.92 EX. 175.99 (−0.07 m)	PR 175.96 EX. 176.03 (−0.07 m)	PR 176.00 EX. 176.07 (−0.07 m)	PR 176.04 EX. 176.08 (−0.04 m)	PR 176.08 EX. 176.09 (−0.01 m)	PR 176.12 EX. 176.12 (0.00 m)	PR 176.16 EX. 176.16 (0.00 m)	PR 176.19 EX. 176.19 (0.00 m)	PR 176.23 EX. 176.25 (−0.02 m)	PR 176.27 EX. 176.34 (−0.07 m)	PR 176.29 EX. 176.37 (−0.08 m)	PR 176.31 EX. 176.40 (−0.09 m)	PR 176.32 EX. 176.39 (−0.07 m)	PR 176.33 EX. 176.38 (−0.05 m)	PR 176.34 EX. 176.37 (−0.03 m)	PR EX. 176.40 m	
DATA NOTES	EWA/CofPC RTK GPS SURVEY, DEC. 2018																		
DESIGN GRADE POINT DATA	STA: 0+004 N=4749407.0 E=645506.8 ELEV=175.85 EWA 2018	EX. OPEN CHANNEL: BW=0.4m TW=2.95m d=0.85m SS=1.5																	
								STA: 0+127 N=4749410.8 E=645533.8 ELEV=176.09 EWA 2018	EX. OPEN CHANNEL: BW=0.4m TW=2.95m d=0.85m SS=1.5										
													STA: 0+232 N=4749464.6 E=645703.9 ELEV=176.29 EWA 2018	EX. OPEN CHANNEL: BW=0.4m TW=2.95m d=0.85m SS=1.5						
																		STA: 0+337 N=4749466.1 E=645793.9 ELEV=176.35 EWA 2018	
CONSTRUCTION NOTES	0+000 CLEAR VEGETATION AND RE-GRADE TO DESIGN GRADELINE. NORTH SIDE WORKZONE																		
								0+126 POND TO REMAIN AS IS NORTH SIDE WORK ZONE											
										0+180 CLEAR VEGETATION AND RE-GRADE TO DESIGN GRADELINE. WEST SIDE WORKZONE										
													0+232 SPOT TREE REMOVAL AS DIRECTED SOUTH SIDE WORKZONE.						
PROPERTY INFO. LIB	ARN: 405200																	0+337.2	
RIB	340m																	20m ROW: LORRAINE RD.	

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NO.	REVISION DESCRIPTION	DATE
1	ISSUED FOR REPORT	April 15, 2020

LICENSED PROFESSIONAL ENGINEER
PAUL C MARSH
May.07, 2020
PROVINCE OF ONTARIO

MICHENER MUNICIPAL DRAIN SPECIFIC DETAIL

CITY OF PORT COLBORNE

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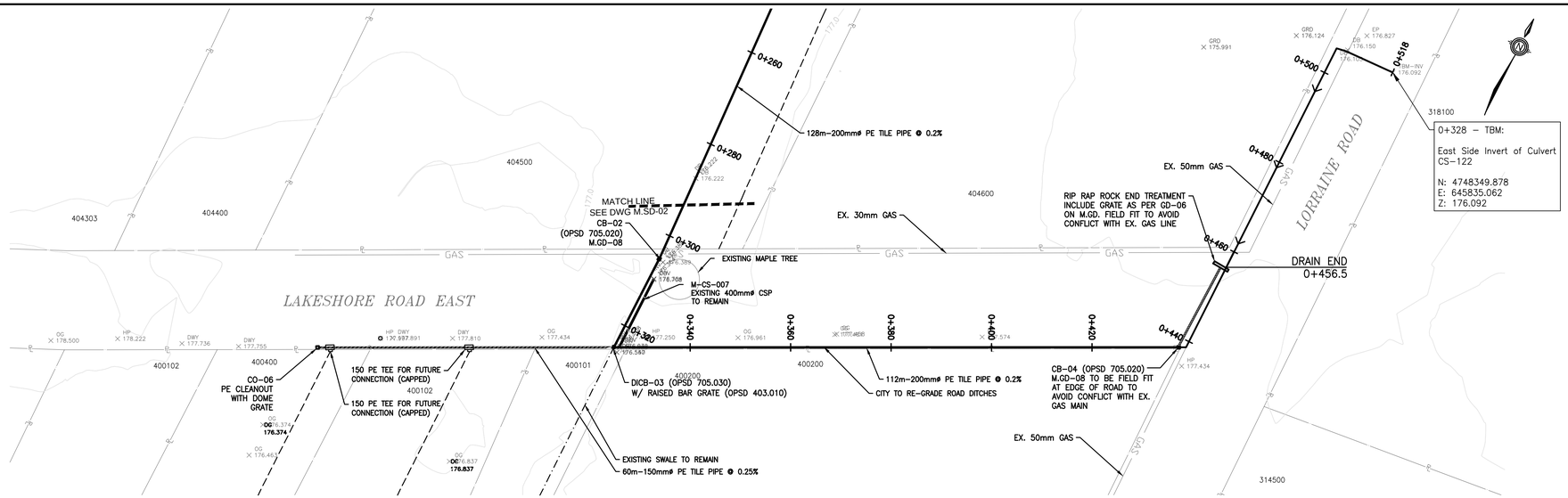
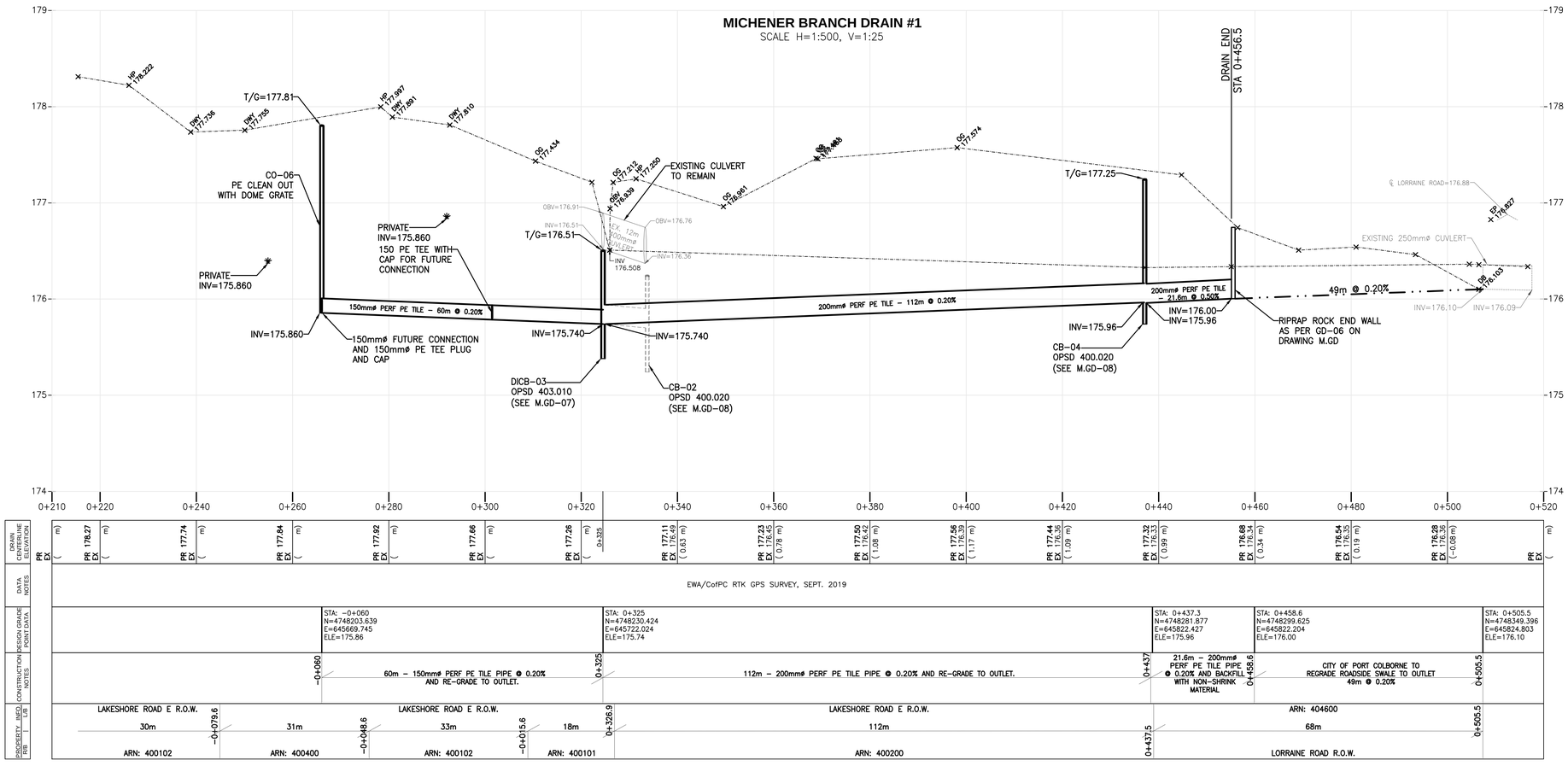
DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
DAC	PCM	189399	M.SD-04
DESIGNED BY :	DATE :	SCALE :	
PCM	14-Apr-20	AS SHOWN	



PLAN VIEW

SCALE 1:500



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1	ISSUED FOR REPORT	MAY/06/2020

PAUL C MARSH
May 07, 2020

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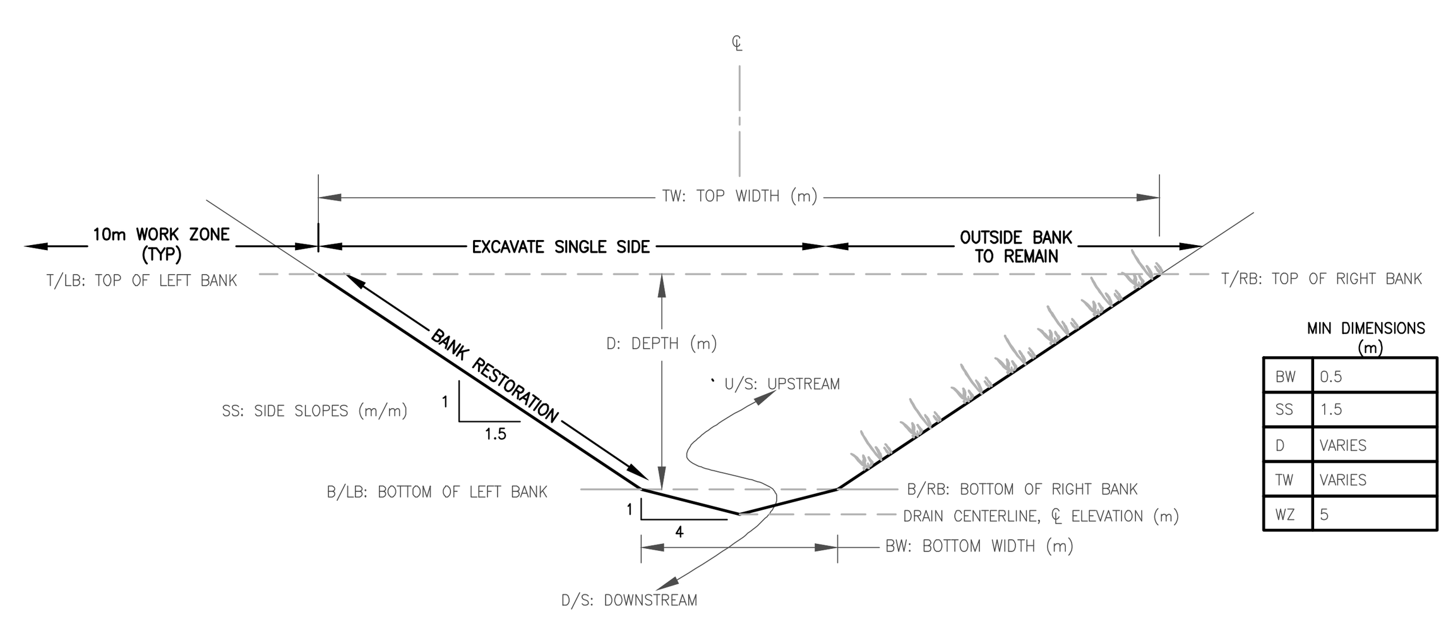
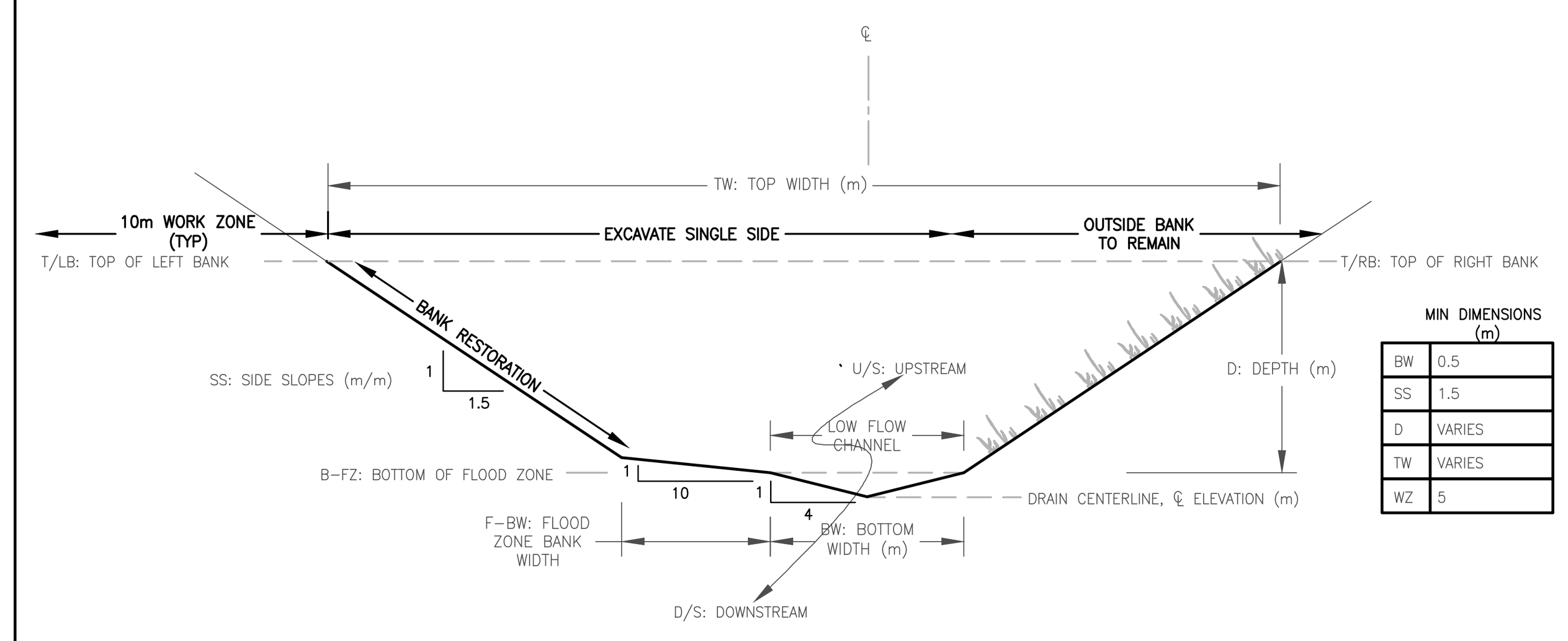
DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
DAC	PCM	189399	M.SD–05
DESIGNED BY :	DATE :	SCALE :	
PCM	06–May–20	AS SHOWN	



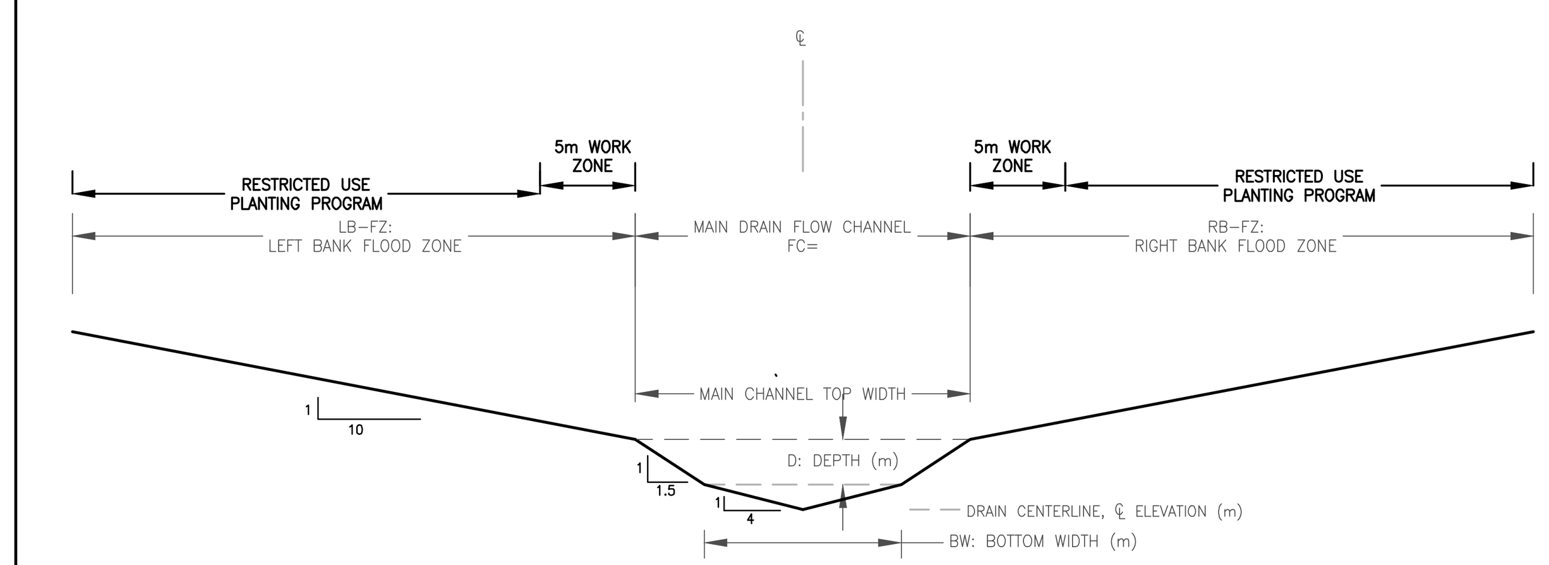
MIN. DIMENSIONS (m)	
BW	0.5
SS	1.5
D	VARIES
TW	VARIES
WZ	5

GD-01
DRAIN CHANNEL DIMENSIONS
NOT TO SCALE



MIN. DIMENSIONS (m)	
BW	0.5
SS	1.5
D	VARIES
TW	VARIES
WZ	5

GD-02
FLOOD ZONE DRAIN CHANNEL DIMENSIONS
NOT TO SCALE



GD-03
NATURAL DRAIN CHANNEL DIMENSIONS
NOT TO SCALE

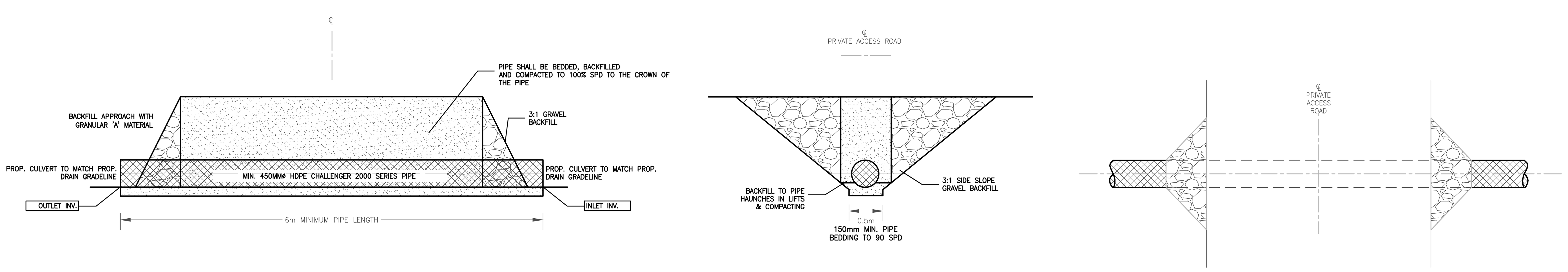
PROFILE VIEW
SEDIMENT BASIN - DURING CONSTRUCTION

SECTION A-A
SEDIMENT BASIN - DURING CONSTRUCTION

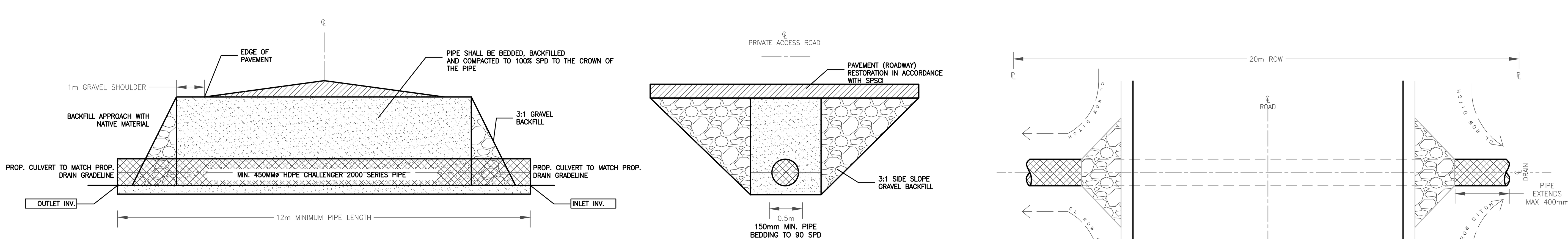
PLAN VIEW
SEDIMENT BASIN - POST-CONSTRUCTION

PROFILE VIEW
SEDIMENT BASIN - POST-CONSTRUCTION

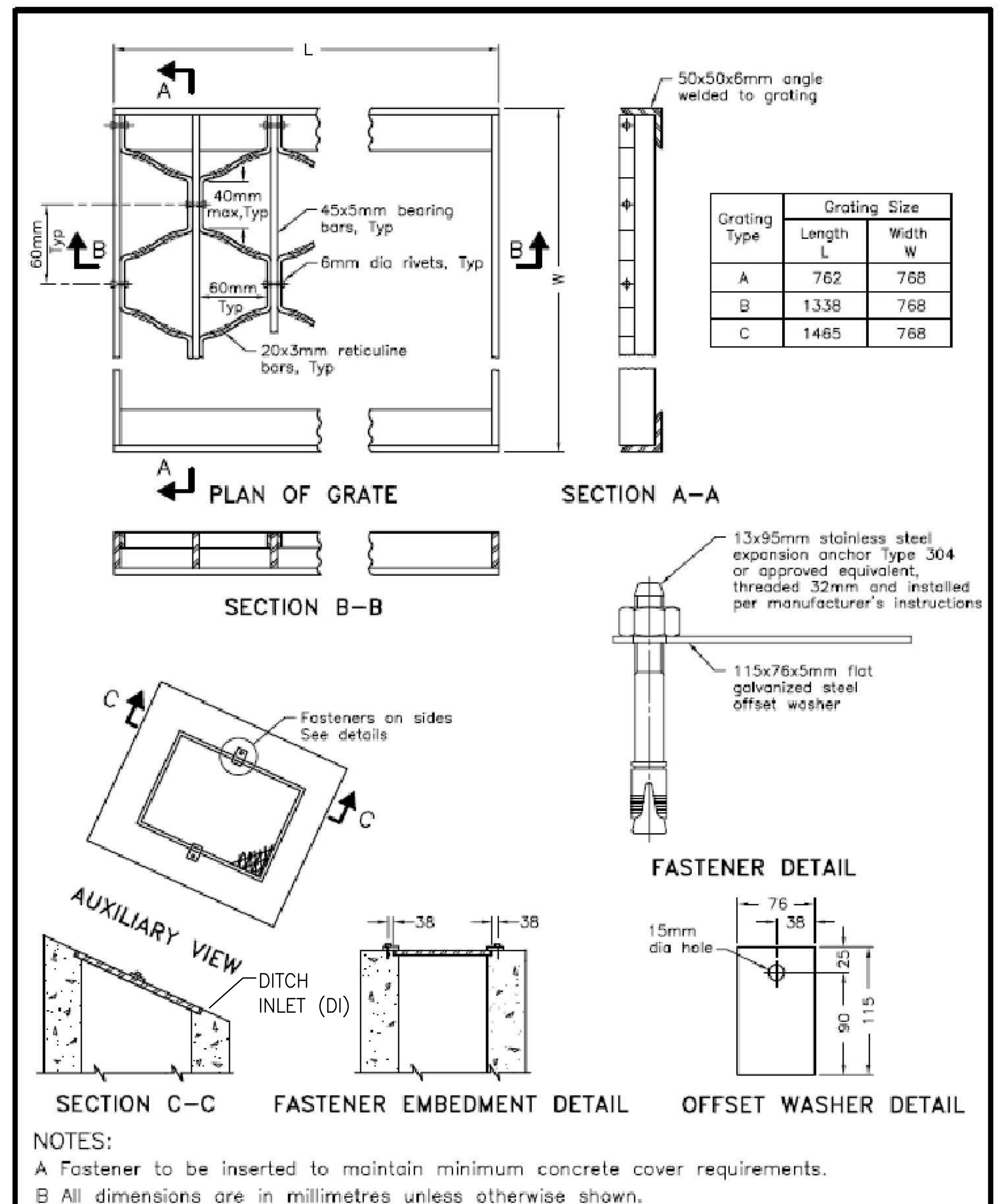
GD-10
SEDIMENT BASIN
NOT TO SCALE



GD-05
TYPICAL PRIVATE ACCESS ROAD CIRCULAR CULVERT INSTALLATION
NOT TO SCALE



GD-06
TYPICAL MUNICIPAL 20m ROW CULVERT INSTALLATION
NOT TO SCALE



Grating Type	Grating Size Length L	Grating Size Width W
A	762	768
B	1338	768
C	1465	768

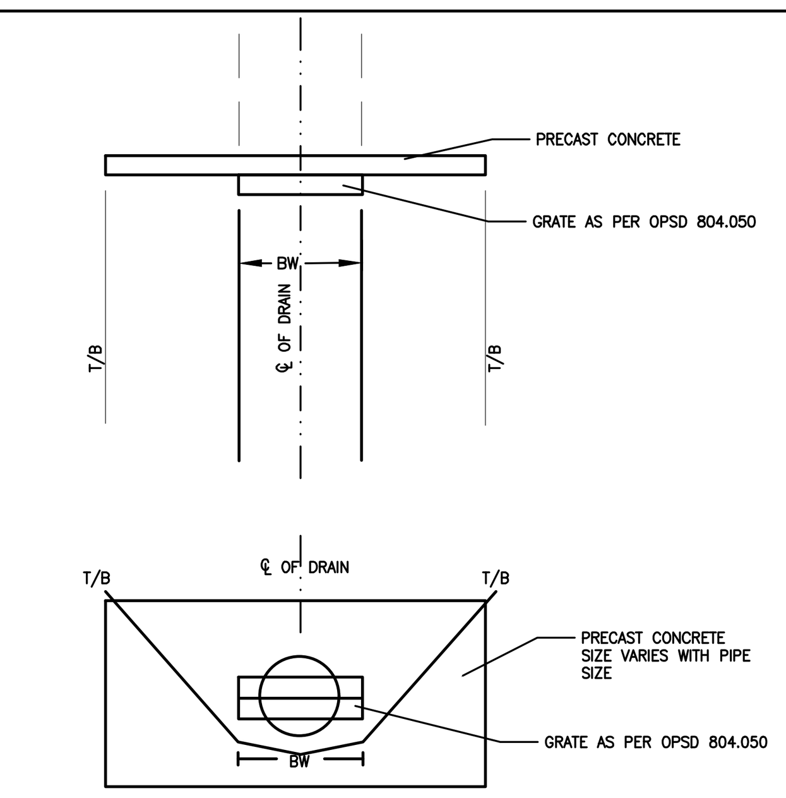
NOTES:
A Fastener to be inserted to maintain minimum concrete cover requirements.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING — Nov 2007 — Rev 1

GALVANIZED STEEL
HONEYCOMB GRATING
FOR DITCH INLETS

OPSD 403.010

GD-07



GD-08
PIPE INLET/OUTFALL WITH GRATE
NOT TO SCALE

MICHENER MUNICIPAL DRAIN GENERAL DETAILS

PORT COLBORNE

CITY OF PORT COLBORNE

Paul C. Marsh, P.Eng. Principal Engineer
EWA Engineering Inc.
www.ewaeng.com

LICENSED PROFESSIONAL ENGINEER — PAUL C MARSH — PROVINCE OF ONTARIO — May 07, 2020

DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
DAC	PCM	–	M.GD
DESIGNED BY :	DATE :	SCALE :	
PCM	06–May–20	N/A	

CITY OF PORT COLBORNE DRAINAGE CONTACTS:

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GENERAL NOTES:

THE CITY SHALL ARRANGE A PRE-CONSTRUCTION MEETING PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

ALL CONSTRUCTION MATERIALS AND METHODOLOGIES SHALL BE IN ACCORDANCE WITH:

- SPECIAL PROVISIONS - SUPPLEMENTARY GENERAL CONDITIONS (SPSGC)
- SPECIAL PROVISIONS - SUPPLEMENTARY CONTRACT ITEMS (SPSCI)
- NIAGARA PENINSULA STANDARD CONTRACT DOCUMENTS (NPSCD)
- ONTARIO PROVINCIAL STANDARDS FOR ROADS & PUBLIC WORKS (OPSS & OPSD)

AND ANY OTHER APPLICABLE STANDARDS THAT MAY APPLY.

IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT THESE MATERIALS AND METHODOLOGIES ARE STRICTLY ADHERED TO.

THE CITY OF PORT COLBORNE AND STAFF DISCLAIMS ANY LIABILITY AS TO THE CURRENT ACCURACY OF THE DRAWINGS PROVIDED. IN USING THE INFORMATION SHOWN OR CONTAINED ON THESE DRAWINGS, THE USER AGREES IMPLICITLY AND EXPLICITLY THAT THE CITY OF PORT COLBORNE AND STAFF SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES ARISING FOR THE USE OF SUCH INFORMATION. THE USER SHALL DO AN IN-FIELD VERIFICATION OF THE INFORMATION SHOWN ON OR CONTAINED WITHIN THESE DRAWINGS.

IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ANY APPROVALS WHICH MAY BE REQUIRED PRIOR TO THE COMMENCEMENT OF CONSTRUCTION UNLESS DIRECTED OTHERWISE BY THE CONTRACT ADMINISTRATOR.

DIMENSIONING SHALL GOVERN OVER SCALED DIMENSIONS.

ANY WORKS COMPLETED IN SET-BACK AREAS, AND DISCHARGE TO CREEKS, STREAMS AND WATERCOURSES MAY BE SUBJECT TO FEDERAL AND PROVINCIAL APPROVALS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN SUCH APPROVALS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION IF REQUIRED FOR THE PROJECT.

PUBLIC UTILITIES:

THE CONTRACTOR SHALL NOTE THAT PUBLIC UTILITIES SHALL INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING, HYDRO, GAS, BELL, CABLE AND FIBRE OPTIC.

IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN THE NECESSARY CLEARANCES FROM SAID PUBLIC UTILITIES WHICH MAY BE IN DIRECT CONFLICT WITH THIS PROJECT.

ANY WORK REQUIRING EITHER RELOCATION/LOWERING OF SAID PUBLIC UTILITY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE UTILITY, AND ANY WORKS WILL BE REQUIRED TO BE COMPLETE PRIOR TO THE INSTALLATION OF THE WORK.

ENVIRONMENTAL COMPLIANCE:

THE CONTRACTOR SHALL PREPARE AN ENVIRONMENTAL MANAGEMENT PLAN (EMP) PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. THE EMP WILL ADDRESS THE FOLLOWING MAJOR SUBJECT AREAS:

- EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION
- TREE PROTECTION & REMOVAL (SAR - BUTTERNUT)
- MINIMIZE AND/OR MITIGATION MEASURES FOR CONSTRUCTION IMPACTS ON SPECIES AND SPECIES HABITAT INCLUDING STOPPING CONSTRUCTION PROCEDURES.
- AGENCY CONTACTS - IDENTIFY RESOURCES & CONTACT INFO.

THE CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH SPECIES AT RISK (SAR) LEGISLATION. BY LAW, YOU MUST IMMEDIATELY:

- AVOID DRAINAGE WORK DURING REPRODUCTION AND REARING SEASONS
- PREVENT A SPECIES FROM ENTERING THE WORK AREA (E.G. PUTTING UP A FENCE)
- GIVE THE SPECIES ADEQUATE TIME TO LEAVE THE AREA, BEFORE STARTING WORK
- GET ADVICE/HELP BEFORE YOU MOVE IT
- PROTECT AREAS THAT ARE IMPORTANT TO THE SPECIES (E.G. SPAWNING AREAS)
- CONTROL EROSION AND SEDIMENT
- STABILIZE WATER BANKS IN AFFECTED AREAS

TURTLES:

- YOU CANNOT REDUCE THE AMOUNT OF WATER IN A DRAIN OR DITCH WHERE A TURTLE IS HIBERNATING.

ABREVATIONS USED:

- BD - SEDIMENT BASIN BOTTOM DEPTH (FROM GRADE LINE)
- BL - SEDIMENT BASIN LENGTH
- BW - BOTTOM WIDTH OF CHANNEL
- CL - CENTRELINE OF ROAD, CHANNEL
- CLCK - CENTRELINE OF CREEK OR CHANNEL
- D - DEPTH
- E - EASTING
- ELEV - ELEVATION
- EX. - EXISTING
- INV - INVERT
- LB - LEFT BANK, LOOKING UPSTREAM
- N - NORTHING
- PL - PROPERTY LINE
- PR. - PROPOSED
- RB - RIGHT BANK, LOOKING UPSTREAM
- RH - RIFFLE HEIGHT
- ROW - RIGHT OF WAY
- SS - SIDE SLOPE; RUN(m)/RISE, WHERE RISE=1m
- T/C - TOP OF CONCRETE
- T/B - TOP OF BANK
- T/G - TOP OF GRATE (BOTTOM ELEV. FOR SLANT TOP)
- TL - TRANSITION LENGTH FROM CHANNEL TO SEDIMENT BASIN BOTTOM WIDTH
- TW - TOP WIDTH OF CHANNEL
- TYP - TYPICAL
- WZ - WORK ZONE
- EOD - END OF DRAIN
- U/S - UPSTREAM
- D/S - DOWNSTREAM

OPSD REFERENCED DETAILS:

- OPSD 219.200
- OPSD 219.220
- OPSD 222.050
- OPSD 400.020
- OPSD 403.010
- OPSD 705.040
- OPSD 803.010

MICHENER MUNICIPAL DRAIN CONSTRUCTION NOTES

PORT COLBORNE

CITY OF PORT COLBORNE

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LICENSED PROFESSIONAL ENGINEER
PAUL C MARSH
04/14/2020
PROVINCE OF ONTARIO

DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
DAC	PCM	-	M.CN
DESIGNED BY :	DATE :	SCALE :	
PCM	14-Apr-20	N/A	

Appendix B:

Specifications

SPECIAL PROVISIONS - MUNICIPAL DRAIN

I N D E X

A1 ROLES

The Contractor is responsible for the construction site including all approvals required for compliance with applicable legislation not already completed by the City of Port Colborne.

The City of Port Colborne, who is further recognized as The Owner, shall be responsible party for allocation of resources in support of construction where required, such as road occupancy permits during construction.

The Drainage Engineer or the Drainage Superintendent shall supervise construction and the Drainage Engineer, Drainage Superintendent or their representative shall respond to any requests by the Contractor and identify any deficiencies between the Contractor's work and the Design documents.

The Drainage Engineer is the responsible designer and will provide technical direction to the Contractor on an as needed and as requested basis from the Drainage Superintendent or their representative.

A2 ENVIRONMENTAL CONDITONS AND COMPLIANCE

The Contractor is wholly responsible for the site environmental conditions, compliance with applicable approvals and existing legislation. The Owner will facilitate environmental approvals, but the Contractor shall control the site and be the responsible party for all construction activities.

General requirements to be fulfilled by Contractor:

a) Department of Fisheries and Oceans, DFO.
   Requirements to protect Fish and Fish habitat.
b) Endangered Species Act, 2007 ONTARIO REGULATION 230/08
   https://www.ontario.ca/page/species-risk
c) Ontario Water Resources Act, R.S.O. 1990, c. O.40
d) On-Site and Excess Soil Management, 2019 ONTARIO REGULATION 406/19 Environmental Protection Act
e) O. Reg. 675/98: Classification and Exemption of Spills and Reporting of Discharges, Environmental Protection Act, R.S.O. 1990

Any other legislation applicable to the jurisdiction of the works.

A3 CONSTRUCTION LAYOUT

Conditions stipulated in the Niagara Peninsula Standard Contract Document also apply. Failure to comply with these conditions will result in a reduction in payment to this item.

a) Stakes

Contractor is responsible for setting any layout, alignment or grade control stakes required for construction. A Stake shall be placed to mark every cross-section grade and a second stake shall be placed to mark the limits of the Working Zone. Work Zone Stake shall be 4' wooden stake painted red at the top of the stake. Grade stake shall be placed at the Work Zone Top of Bank. X-Section stakes shall be placed at a maximum spacing of 25m. A recommended spacing shall coincide with the Profile drawings. Prior to the start of Construction, the Contractor will stake and identify the difference between the existing grade and the design grade. The Drainage Engineer shall review the stakes and the measurement of the soil to be removed. Post Construction, the Contractor shall remove all stakes.

b) Project Signage

The Contractor is responsible for the installation and removal of all construction signage and is responsible for daily maintenance of all signage throughout the contract.

A5 INSTALL AND MAINTAIN SEDIMENT CONTROL DEVICES

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document and OPSS 577, the following shall also apply:

a) SILT FENCE

Silt fence is to be placed prior to disturbing soil adjacent to the drain that could be carried by runoff into the drain. This excludes the area of the drain where The Contractor is working to re-establish Drain grade and cross-section. It includes areas adjacent to the drain impacted by clearing and grubbing for work access.(missing is a description of where a silt fence is to be placed. How frequently across the drain.)

Silt fence shall be installed in accordance with OPSD 219.190 except that the minimum height above the invert of the drain shall be 500 mm. Silt fence materials shall be in accordance with OPSS 577.05.02.02 for geotextile and OPSS 577.05.03 for stakes. Stakes shall be 1.5 m minimum height.

The silt fence shall remain in place for the duration of the section that the Contractor is working and the Contractor shall make every effort to maintain it throughout the project. The Contractor shall request Approval from the Engineer or the Drainage Superintendent for the removal of the silt fence once each section of the drain is complete. Prior to the removal of the silt fence, the accumulated silt shall be removed and leveled adjacent to the drain in accordance with the disposal of excavated material section.

b) SEDIMENT BASINS

Sediment basins have been provided along the length of the drain in an effort to minimize the transport of sediment. The Contractor shall construct the sediment basins in accordance with the construction drawings in the locations indicated. Relocation of sediment basins can only be undertaken upon approval of the Engineer.

The Sediment basin is to be constructed prior to the upstream work and shall be monitored during construction for sediment accumulation and sediment removed if the basin has more than 50% of the 0.5m depth occupied with sediment. Once the upstream work is complete, the Sediment basin shall be converted from Construction to Final as per the Design Detail Drawings. Sediment accumulated during construction shall be removed and disposed of in the manner directed by the Contract.

A5 PAYMENT; For progress payment, fifty (50) percent of the lump sum price will be paid upon installation with the balance to be paid with the final payment.

A6 ACCESS & NOTICE

The City of Port Colborne's Drainage Superintendent or designate shall provide affected landowners with notice of the commencement of construction.

It will be the Contractor's responsibility to inform the various businesses and residences of daily construction impacts in order to reduce/eliminate any problems with parked vehicles that may interfere with their operations. Ingress & egress to the abutting businesses and residences must be maintained at all times.

The Contractor shall advise the Police Department, Fire Department and Niagara Emergency Medical Service on a daily basis, with current status of the construction as it pertains to the passage of traffic within the contract limits.

The Contractor will co-ordinate with local transit to ensure minimum interruption to bus schedules. Transit, school buses and garbage and recycling service vehicles will be given priority to maintain their schedule.

The Contractor shall also maintain/provide existing pedestrian access at all times to the businesses and residents during all phases of construction in an acceptable manner.

A6 PAYMENT; Payment as a lump sum bid for this item shall be full compensation for all labour, equipment and materials necessary to meet the above requirements. Fifty (50) percent of the lump sum price will be paid on the first payment certificate. The balance will be prorated over the remainder of the working period.

B1 EARTH EXCAVATION

Work under this item shall include the supply of all labour, equipment and materials required for ditch excavation or any other type of excavation or earth work as outlined on the Contract Drawings. Ditch work involves clearing, excavation, leveling, and seeding as required. Specifications and information on the Contract Drawings shall take precedence over the standard specifications outlined below. The specifications below shall take precedence over the Niagara Peninsula Standard Contract Document Special Provisions B2.

B2 CONSTRUCTION

a) Vegetation Removal

All trees, brush, fallen timber and debris shall be moved from the ditch cross-section and to such a distance on each side to eliminate any interference with the spreading of the spoil. The roots shall be left in the banks if no bank excavation is required as part of the new channel excavation. In wooded or heavily overgrown areas all cleared material may be pushed into piles or rows along the edge of the cleared path and away from leveled spoil. All dead trees along either side of the drain that may impede the performance of the drain if allowed to remain and fall into the ditch, shall be removed prior to excavation and put in piles, unless directed otherwise by the Engineer.

Any tree removed will be offered as wood to the property owner in the form of logs from the trunk where they lay and to be moved from the site by the owner at their expense. Tree tops shall be cut and limbs stacked as piles adjacent to the drain and within the work zone.

b) Excavation

The bottom width and the side slopes of the ditch shall be as shown on the profile(s) and/or cross-sections on the Contract Drawings. Side slopes are normally one and one-half metre horizontal to one metre vertical (1.5:1) unless otherwise noted on the Contract Drawings. If a bottom width is not specified then any excavation required shall be from the bottom of the ditch without disturbing the bank slopes subject to the clearing of brush required as described in a).

c) Profile

The profile(s) on the Contract Drawings show the depth and grade for the drain improvements. The description and elevation of benchmarks that were established during the survey are shown on the profile(s) in the location for each benchmark.

d) Line

The drain shall follow the course of the existing channel and/or shall be constructed in a straight line as outlined on the Contract Drawings. A uniform grade shall be maintained in accordance with the profile(s). A variation of one hundred millimeters (100mm) above the required grade will require the Contractor to remedy the grade to that given on the profile. The Contractor may be required to backfill any portion of the ditch that is excavated more than two hundred millimeters (200mm) below the required grade. All curves shall be made with a minimum radius of fifteen metres (15m).

e) Excavated Material

Excavated material (spoil) shall be deposited on either or both sides of the drain as directed on the Contract Drawings. Spoil upon excavation shall be placed a minimum one (1) metre back from the top of the bank, either existing or new. No excavated material shall be placed in tributary drains, depressions, or low areas, which direct or channel water into the ditch so that no water will be trapped behind the spoil bank. The excavated material shall be placed and leveled to a maximum depth of three hundred

millimeters (300mm); unless otherwise instructed. The edge of the spoil bank away from the ditch shall be feathered down to existing ground. The edge of the spoil bank nearest the ditch shall have a maximum slope of 2:1. The material shall be leveled such that it may be cultivated with ordinary equipment without causing undue hardship on farm machinery and farm personnel. Wherever clearing is necessary prior to leveling, the Contractor shall remove all stumps unless the Contract Drawings specify that stumps can be covered with the leveled spoil. No excavated material shall cover any logs, brush or rubbish of any kind. Large stones or boulders in the leveled spoil that are heavier than fifteen kilograms (15kg or approximately 300mm in size roughly referred to as man stone or the size of a stone that a single person can carry.) shall be moved to the edge of the leveled spoil nearest to the ditch but in general no closer than one metre (1) to the top of bank.

Where it is necessary to straighten any unnecessary bends or irregularities in the alignment of the ditch or to relocate any portion of an existing ditch, the excavation from the new cut shall be used for backfilling the original ditch. Regardless of the distance between the new ditch and old ditch, no extra compensation will be allowed for this work. If the Contractor obtains written permission from an affected landowner stating that the owner does not wish the spoil to be leveled and such is approved by the Engineer, the Engineer may release the Contractor from the obligation to level the spoil. If spoil is not leveled that was to be leveled as part of the Contract, the Engineer shall determine the credit to be applied to the Contractor's payment. No additional compensation is provided to the owner if the spoil is not leveled.

If the affected landowner requests that the spoil be removed from the site instead of being spread adjacent to the drain within the work zone or that the grading requirement is to a higher standard than suitable for agricultural cultivation, then the Contractor shall provide trucking of the spoil including disposal at a suitable site or additional grading and shall provide the Drainage Superintendent with the specific costs for each landowner who requests such work. The Engineer shall assess the cost of the trucking of spoil to the landowner making such request.

The Engineer may require the Contractor to obtain written statements from any or all of the landowners affected by the leveling of the spoil. A written statement from the owners indicating their complete satisfaction with the leveling of the spoil is sufficient to comply with this specification. The final decision, with respect to leveling of the spoil, shall be made by the Engineer.

f) Excavation Through Woodlots

The Contractor shall minimize disturbance through woodlots by reducing the limit of excavation to the bottom width of the drain and a minimum side slopes. The drain shall be routed around existing trees at the direction of the Drainage Superintendent or where requested by the Engineer.

Prior to performing work through a woodlot, the Contractor in coordination with the Drainage Superintendent shall mark all trees for preservation or removal within the Drain or Workzone. This mark will consist of a physical identification that will be easily

understood by the landowner and consist of either colour ribbons or specific paint markings (green to keep, red mark of an ‘X’ for removal).

g) Excavation at Bridge and Culvert Sites

The Contractor shall excavate or clean through all bridges and culverts to match the grade line and the downstream channel cross-section. Bridges that span from bank to bank may be carefully removed to permit excavation below the bridge and then replaced to original condition. Permanent bridges must be left intact. All necessary care and precautions shall be taken to protect the structure. The Contractor shall notify the Engineer before completing excavation in the area of a bridge or culvert if the excavation will expose the footings or otherwise cause bridge instability.

Where the invert of any pipe culvert is above the grade line, the Contractor will be required to remove the culvert, clean and relay it, so that the invert of the culvert is one hundred and fifty millimetres (150mm) below the grade for the ditch bottom at this location.

h) Obstructions

In all cases, the Contractor shall ensure that the finished drain is clear of obstructions to flow. The contractor will ensure that trunks are cut flush and that any debris or snags are removed as part of the bid price.

i) Fences and private furniture or equipment

The contractor will use the identified work zone for access and shall restore any fences to an equivalent or better condition than before construction. Where possible the Contractor shall perverse existing fences, private equipment and furniture in place but where it must be moved, the Contractor shall in all cases restore to a like or better condition than existed before construction.

j) Tile Outlets

The location of all existing tile outlets may not be shown on the profile for the drain. The Contractor shall contact each owner and ensure that all tile outlets are marked prior to commencing excavation on the owner’s property. If a marked tile outlet is damaged during, or altered due to construction, the Contractor shall repair or replace the damaged or altered outlet as part of the Contract. If an existing outlet pipe does require replacement the Contractor shall confirm the replacement outlet pipe with the Engineer. All tile outlets identified are considered part of the bid work.

Additional payment will be allowed for the repair or replacement of any unmarked tile outlets encountered during excavation. Where stone or concrete riprap protection exists at any existing tile outlet such protection shall be removed and replaced as necessary to protect the outlet after reconstruction of the channel.

If any outlet becomes plugged as a result of construction, the Contractor shall be obligated to free such outlet of any impediments. Where any damage results to tile

leading to and upstream of the outlet, as a consequence of such construction, the Engineer may direct the Contractor to repair such tile and shall determine a fair compensation to be paid to the Contractor for performing the work.

B3 INSTALLATION OF NEW CULVERT

Work under this item shall include the supply of all labour, equipment and materials required for supply and installation of culverts as outlined on the Contract Drawings. The Niagara Peninsula Standard Contract Document Special Provision B7 shall apply but the specifications and information on the Contract Drawings shall take precedence over Special Provision B7.

Payment shall be as per Plan Quantity.
The size and material for any new ditch crossings shall be as specified on the Contract Drawings. Any crossings assembled on-site shall be assembled in accordance with the manufacturer's specifications for on-site assembly.

Where a new crossing replaces an existing crossing the following shall apply:

If directed on the drawings that the existing crossing is to be salvaged for the owner the Contractor shall carefully remove the existing crossing and leave along the ditch or haul to a location as specified on the Drawings.

If the existing crossing is not to be saved then the Contractor shall remove and dispose of the existing crossing. Disposal by burying on-site is not permitted.

All new pipe crossings shall be installed a minimum of 100mm below design grade (not as-constructed grade) or at the invert elevations as specified on the Drawings. If the ditch is over excavated greater than 200mm the Contractor shall confirm with the Engineer the elevations for installation of the new pipe crossing.

When an existing crossing is being replaced the contractor shall save all granular and riprap. New crossings can be backfilled with compacted on-site native material that is free of large rocks or stones. Contractor responsible for any damage to a culvert pipe as a result of rocks or stones in the backfill.

All new crossings shall have a minimum 6m laneway width and end slopes shall be at 1:1 slope or flatter. Finished crossing elevation shall provide a minimum of 300mm cover. Finished crossing surface shall be a minimum 150mm depth of Granular A for the minimum 6m width and extending from top of bank to top of bank using salvaged granular or imported granular as required.

Installation of private crossings during construction must be approved by the Engineer before the culvert is installed.

Where riprap protection is called for at either or both ends of a new culvert, such riprap shall be in accordance with Special Provision B4.
Payment will be based on plan quantity.

Riprap to be adequately keyed in along the bottom of the slope. Riprap to extend to top of pipe or as directed on the Drawings. No riprap is required in the ditch bottom on the upstream side of a crossing. If riprap is required in the ditch bottom on the downstream side of a crossing it shall be specified on the Drawings. Any new end face slope not protected by riprap shall be seeded as per specifications for ditch bank seeding.

B4 HAND LAND RIP RAP WITH FILTER CLOTH

Rip rap complete with filter fabric underlay (geotextile) shall be placed by the Contractor at the locations shown on the drawing or as requested by the Drainage Superintendent. Rip rap shall consist of 200 – 250 mm dia. stones (min.) and shall be placed at 300 mm minimum thickness. Along upstream edges, where surface water will enter the drain, the underlay shall extend a minimum of 300 mm upstream from the rip rap and be keyed into the soil a minimum of 300 mm. The finished elevation of the rip rap shall be at design elevation or flush with the ground.

Work under this item shall include the supply of all labour, equipment and materials required for placing riprap as outlined on the Contract Drawings. The Niagara Peninsula Standard Contract Document Special Provision B20 shall apply but the specifications and information on the Contract Drawings shall take precedence over Special Provision B20.

Payment shall be as per Plan Quantity.

C1 COMPLETION

At the time of final inspection, all work in the contract shall have the full dimensions and cross-sections specified.

PAYMENT; Payment is for all work complete on the basis of a measured linear distance inclusion of all items identified above. Where a culvert is removed and reinstalled, compensation shall be in the form of a per each payment. Where a tile is discovered and constructed as an outlet, compensation will be in the form of a per each payment for tile outlets repaired.

C2 AS-CONSTRUCTED DOCUMENTATION

For the 'as-constructed' works, the Contractor must provide the City of Port Colborne with an electronic version of the final drainage works as surveyed post construction, to be imported into AutoCAD or GIS. This copy must confirm that the design grade and cross-section details for all drainage work and the invert elevations and lengths for all culverts complies with the Engineer's Report. Survey spacing shall be to a minimum of 25m.

All work must be in an acceptable electronic format that the City of Port Colborne can use and all work must be completed using the verified geodetic benchmarks. The submission of the As-Constructed works will be in a common delimited format having the form as follows:

Numeric key, Northing, Easting, Elevation, Coded identifier & optional description
For the coded identifiers, the City of Port Colborne will provide a table for reference along with an example file from a past project for comparison. The City will certify the as-constructed files with respect to their completeness.

Failure to provide a certified as-built file will result in the delay of substantial completion and/or contract completion. In the event that the contractor asks the City to perform the AS CONSTRUCTED SURVEY, then payment for the lump sum item is negated.
A4 PAYMENT; Payment in full at the lump sum bid price for this item shall be made only upon completion and approval by the Contract Administrator.

Appendix C:

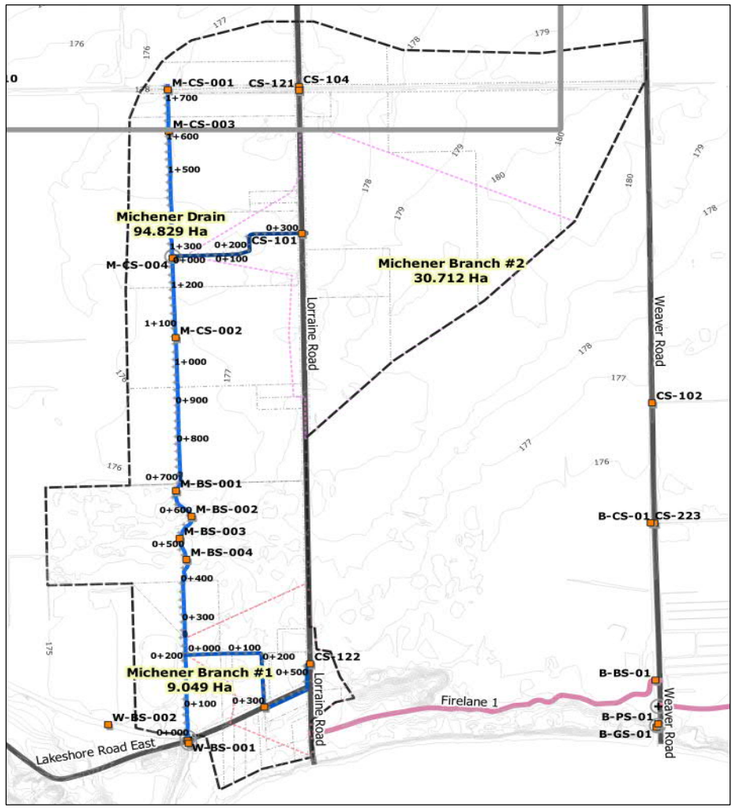
Cost Estimates & Assessment Tables

Michener Municipal Drain

City of Port Colborne
Regional Municipality of Niagara

Section 78 and Section 4 Works under the Municipal Drainage Act.

Item		Drainage Assessment			Costs	
1		Summary Cover page				
2	Estimated Construction Costs					
		Michener Branch Drain #1	$	30,271.50		
		Michener Branch Drain #2	$	3,325.00		
		Michener Drain	$	32,147.50		
		Michener General Construction Costs	$	14,968.00		
		Michener Contingency	$	13,148.80		
		Estimated Cost of Construction			$	93,860.80
3	Previous Construction Works Completed but not Assessed					
		None Identified				
		Previous Construction, (Prior to 2018)				$0.00
4	Eligible Administration Costs					
		Engineering	$	87,990.88		
		Administration Cost Allocations	$	-		
Ha Ratio	Ha	Allocating Admin costs to each catchment for Section 23				
0.067	9.049	Michener Branch Drain #1	$	5,915.96		
0.228	30.712	Michener Branch Drain #2	$	20,078.58		
0.705	94.829	Michener Drain	$	61,996.34		
		Administration Costs			$	87,990.88
5	Drain Allowances					
		Michener Branch Drain #1	$	5,903.25		
		Michener Branch Drain #2	$	7,904.90		
		Michener Drain	$	3,361.49		
		Allowances			$	17,169.64
		Forecasted Total Drain Costs			$	199,021.32
6	Benefit Assessment (Section 22)					
		Michener Branch Drain #1	$	3,673.00		
		Michener Branch Drain #2	$	4,845.00		
		Michener Drain	$	-		
		Total - Benefit Assessment (Section 22)			$	8,518.00
7	Outlet Liability Assessment (Section 23)					
		Michener Branch Drain #1	$	29,827.28		
		Michener Branch Drain #2	$	26,463.48		
		Michener Drain	$	119,512.13		
		Total - Outlet Liability Assessment (Section 23)			$	175,802.89
8	Special Benefit Assessment (Section 24)					
		Michener Branch Drain #1	$	-		
		Michener Branch Drain #2	$	-		
		Michener Drain	$	6,110.00		
		Total - Special Benefit Assessment (Section 24)			$	6,110.00
9	Special Assessments (Section 26)					
	Michener Branch Drain #1					
		City of Port Colborne	$	6,590.43		
		Enbridge	$	2,000.00		
			$	8,590.43		
	Michener Branch Drain #2					
		City of Port Colborne		$0.00		
	Michener Drain					
		City of Port Colborne		$0.00		
		Total - Special Assessments (Section 26)			$	8,590.43
					$	199,021.32
10	Drain Assessment Summary Table					



Assessment Schedule Balance:

Prepared by: Paul C. Marsh, P.Eng.

Dated:

LICENSED PROFESSIONAL ENGINEER
PAUL C MARSH
May 07, 2020
PROVINCE OF ONTARIO

Michener Municipal Drain
City of Port Colborne
Regional Municipality of Niagara

Proposed Construction - Cost Estimate

Michener Branch #1

Cost ID:	From STA	To STA	Work	Description	Linear, Each or Lump Sum Cost Type	Length	$/m	Qnty	/each	$	Notes
M1-11	0+000	0+177	Remove Vegetation, Clear and Grade to Design Grade Line	Perform work from the South Side	Linear	177	$15			$ 2,655.00	
M1-12	0+177		Catch Basin, CB-01 Construct to Grade and match outlet with grate to channel		Lump Sum			1	$ 2,200.00	$ 2,200.00	
M1-13	0+177	0+305	Combined Swale and 150mm Perforated PE Drainage Pipe		Linear	67	$ 45.00			$ 3,015.00	
M1-14	0+305	0+305	Catch Basin, CB-02		Lump Sum			1	$ 1,850.00	$ 1,850.00	
M1-15	0+302		Enbridge Gas Line Protection during construction and lowering if required.		Lump Sum			1	$ 2,000.00	$ 2,000.00	
M1-16	0+305	0+323.8	400mm Drainage Pipe, CSA 182.2-11 (existing) 200mm PE Tile with Sock	Crossing Lakeshore Rd. E (already installed no cost estimate shown); Tile crossing from CB-02 to CBDI-03	Linear	18.8	$ 55.00	1	$ 750.00	$ 1,784.00	roadway crossing backfill with non-shrink material
M1-17	0+323.8		CBDI-03, Ditch Inlet with GA bar screen as per OPSD 403.010		Lump Sum			1	$ 2,050.00	$ 2,050.00	
M1-18	0+049	0+109	150mm Perforated PE Drainage Pipe	excludes ROW re-grading by CofPC		60	$ 45.00			$ 2,700.00	backfill with native material.
M1-19	0+049		CO-06, PE Clean out access chamber with Dome Drain for cleaning access.		Lump Sum			1	$ 1,500.00	$ 1,500.00	
M1-20	0+109	0+223	150mm Perforated PE Drainage Pipe	Excludes ROW re-grading by CofPC		114	$ 45.00			$ 5,130.00	Road edge backfill with non-shrink material.
M1-21	0+233		Catch Basin, CB-04		Lump Sum			1	$ 2,000.00	$ 2,000.00	
M1-22	0+233	0+244.5	150mm Perforated PE Drainage Pipe	Crossing Lakeshore Rd. E Tile crossing		11.5	$ 55.00	1	$ 750.00	$ 1,382.50	roadway crossing backfill with non-shrink material
M1-23	0+244.5		DI-03, Ditch Inlet with grate	Rip Rap end treatment with grate	Lump Sum			1	$ 1,000.00	$ 1,000.00	
M1-24	0-177	0+244	Remove Vegetation, Clear working zone	As - directed by Drainage superintendent. Re-seeding to original or better.	Linear	67	$ 15.00			$ 1,005.00	re-grade excess material from trenching.
M1-25			Road side swales re-grading							$ -	Cost covered by CofPC.

SubTotal for: Michener Branch #1 $ 30,271.50

Michener Branch #2

Cost ID:	From STA	To STA	Work	Description	Linear, Each or Lump Sum Cost Type	Length	$/m	Qnty	/each	$	Notes
M2-3	0+000	0+125	Remove Vegetation, Clear and Grade to Design Grade Line	Perform work from the North side	Linear	125	$ 15.00			$ 1,875.00	
M2-4	0+125	0+200	existing channel and pond to remain as is.		No cost						
M2-5	0+200	0+345	Selective Vegetation removal and bank stablization.	Spot removals from South side	Linear	145	$ 10.00			$ 1,450.00	

SubTotal for: Michener Branch #2 $ 3,325.00

Michener Drain

Cost ID:	From STA	To STA	Work	Description	Linear, Each or Lump Sum Cost Type	Length	$/m	Qnty	/each	$	Notes
M-1	1+286	1+710	Remove Vegetation, Clean and Grade to Design Grade Line	Perform work from the East side of the Drain.	Linear	424	$ 15.00			$ 6,360.00	
	1+612		Re-place existing culvert	M-CS-003, existing culvert to be improved by replacement.	Lump Sum			1	$ 1,500.00	$ 1,500.00	
M-2	0+690	1+286	Remove Vegetation, Clean and Grade to Design Grade Line	Perform work from the East side of the Drain.	Linear	591	$ 15.00			$ 8,865.00	
M-6a	0+700	0+710	Construct Farm Crossing culvert.	This is a combination flow detention berm and farm crossing. The culvert is sized to pass the 1 year design flow while detaining higher flows to then overflow the crossing as a broad crested weir.	Lump Sum			1	$ 2,500.00	$ 2,500.00	
M-6a	0+710		Construct Sediment Basin upstream of culvert	Remove material and dispose by spreading adjacent to the drain. Sediment Basin constructed in coordination with culvert crossing and prior to commencing work upstream.	per m + per m2	8	$ 50.00	40	$ 55.00	$ 2,600.00	
M-7	0+407.5	0+690	Re-store Grade to design Grade Line		Linear	282.5	$ 15.00			$ 4,237.50	
M-8	0+593		Replace ex. Culvert with properly sized 750mm 2W smooth PE culvert - 3m	M-BS-002 replace with new.	Lump Sum			1	$ 1,500.00	$ 1,500.00	
M-9	0+260	0+250	Construct Sediment Basin at STA 2+400 as per Design and GD-10.	Remove material and dispose by spreading adjacent to the drain. Sediment Basin constructed prior to commencing work upstream.	per m + per m2	10	$ 50.00	52	$ 55.00	$ 3,360.00	
M-10	0+000	0+075	Spot tree removal	Remove between top of bank to top of bank that are reducing outlet flow.	each			35	$ 35.00	$ 1,225.00	
									SubTotal for: Cost ID:	$ 32,147.50	

Construction Mgmt Michener Drain

Cost ID:	From STA	To STA	Work	Description	Linear, Each or Lump Sum Cost Type	Length	$/m	Qnty	/each	$	Notes
			Bonding	Construction Security	% of Constr $					$ 1,972.32	
			Environmental Management - Compliance with legislative requirements	Preparation of Environmental Management Plan - Exclusions for SAR incidents that require on site expertise.	Lump Sum					$ 2,500.00	Program budget - actual cost will vary
			Erosion Control During construction - including conversion of sediment ponds to permanent drain features		Lump Sum					$ 3,500.00	Program budget - actual cost will vary
			Construction Management	Traffic Control, Layout, and all compliance items for submission on construction startup.	% of Constr $					$ 8,218.00	Budget, 12.5% of construction
			Tree Replacement Program	Where private trees are removed for the drain and in lieu of compensation a 2 for 1 tree planting program is available for owners.	Each			15	50	$ 750.00	Program budget - actual cost will vary
									SubTotal for: Construction Mgmt Michener Drain	$ 14,968.00	
									SubTotal for: Michener Drain	$ 80,712.00	
									Contigency Allowance, (20%)	$ 13,148.80	
									Cost of Construction:	$ 93,860.80	

Michener Municipal Drain
City of Port Colborne
Regional Municipality of Niagara

Administration Costs

	Area, Ha	Area Ratio
Michener Drain Area	135	12.02%
Port Colborne Drain Area	345	30.78%
Wignell Drain Area	641	57.20%
	1120	

Categories	Costs	Cost Items		Sub-totals, $	Totals, $
ADMINISTRATION					
	Interim Financing Allowance				0
	Legal and Permitting Fees				0
	Expenses, where applicable				0
	Applicable Taxes				0
	Total - ADMINISTRATION				$ -
ENGINEERING					
	Preliminary Design and Report				0
	Survey, Design, Plans, Engineer's Report and Assessment Schedule (Wiebe)*1				
		Survey; $8,342.93	$	1,002.81	
		Report Preparation; $83,533.94	$	10,040.66	
	Survey, Design, Plans, Engineer's Report (AMEC)*2				
		3-561-33229; 2012 to 2014; $67,147.23	$	8,071.00	
	Survey, Design, Plans, Engineer's Report and Assessment Schedule (EWA)				
		Design Services	$	45,480.00	
		Change Orders	$	13,948.00	
		Portion of Expenses	$	1,514.04	
		Portion of Project Mgmt	$	4,434.38	
	Sub-total: Survey, Design, Plans, Engineer's Report and Assessment Schedule (EWA)				$ 84,490.88
	Tribunal Costs (not estimated and assumed to be zero)				0
	Tendering, and contract agreements (estimated)				$ 3,500.00
	Total - ENGINEERING				$ 87,990.88
TOTAL ADMINISTRATION AND ENGINEERING					$ 87,990.88

*1 Wiebe Engineering was appointed as the Drainage Engineer by Council with an approved budget. The firm declared bankruptcy after having been paid for a portion of the work. This is the amount originaly paid and not recovered.

*2 AMEC was appointed as the Drainage Engineer by Council in 2013, assuming work already completd by Wiebe and with an approved budget. After having been paid for 70% of the work, the company refused to complete the project without additional funds being allocated. The contract was cancelled.
This is the fee for service paid for partially completed work on the drain.

Michener Municipal Drain
City of Port Colborne
Regional Municipality of Niagara

Allowances
Michener Branch #1

Owner	Legal Text	Roll No	ARN ABBREV	Area Ha	Land and Rights of Way: Length m	Top Width	Section 29 Allowance: Area, Ha	$	Work Zone: Work Access $	Damages: Length m	Section 30 Allowance: Area, Ha	$	For Existing Drain: From STN	To STN	Length, m	Section 31 Allowance $	Insufficient Outlet: Section 32 Allowance $	Loss of Access: Section 33 Allowance $	Total of Allowances $
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 21 PT LOT 22 RP;59R8112 PAR	271104000404700	404700	2.176	97.0	2.50	0.0243	$ 599.23	$ -	135.0	0.135	0			95.6	$ 478.00			$1,077.23
NICHOLLS LARRY JAMES	CON 1 PT LOT 21	271104000404500	404500	1.201	126.0	3.00	0.0378	$ 934.06	$ 311.35	126.0	0.126	0			126	$ 630.00			$1,875.41
					69.0	2.65	0.0183	$ 451.83	$ 170.50	69.0	0.069	0			69	$ 345.00			$967.33
City of Port Colborne	Lakeshore Rd. East ROW	ROW	ROW	0.556			0.0000				0.000	0				$ -			$0.00
WINGER LLOYD JAMES JUNIOR	CON 1 PT LOT 21	271104000404600	404600	0.848	0.0	0.00	0.0000	$ -		0.0	0.000	$ -			0	$ -			$0.00
MASON MARTHA JEANNE	CON 1 PT LOT 21	271104000404303	404303	0.729	80.0	3.00	0.0240	$ 593.05	$ 197.68	80.0	0.080	0			80	$ 800			$1,590.74
NIEUWLAND LIEUWE CORNELIS	CON 1 PT LOT 20 RP 59R5493;PART 1	271104000318100	318100	0.560			0.0000				0.000	0				$ -			$0.00
LEON LOU ANN	CON 1 PT LOT 21 RP 59R13013;PART 1	271104000417902	417902	0.517			0.0000									$ -			$0.00
RIVANDO CHRISTOPHER ANTHONY	CON 1 PT LOT 21 PLAN 59R6790;PART 1	271104000404601	404601	0.405			0.0000									$ -			$0.00
DOOLITTLE ROY W III	CON 1 PT LOT 21	271104000400200	400200	0.357			0.0000									$ -			$0.00
O'HARA GREGORY G	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400100	400100	0.295			0.0000									$ -			$0.00
HANNAH ELISABETH WANLESS	PLAN 19 PT LOT 25 PT LOT 26;NP778	271104000314500	314500	0.289			0.0000									$ -			$0.00
LEON JOHN	CON 1 PT LOT 21	271104000404400	404400	0.205	28.0	2.65	0.0074	$ 183.35	$ 69.19	28.0	0.028	0			28	$ 140			$392.54
WEEBADUARACHCHIGE ASELA	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400102	400102	0.134			0.0000									$ -			$0.00
LEON LOU ANN	HUMBERSTONE CON 1 PT LOT 21;PT WATER LOT	271104000400101	400101	0.122			0.0000									$ -			$0.00
DOOLITTLE ROY W III	PLAN 19 LOT 23 LOT 24 NP778	271104000314300	314300	0.071			0.0000									$ -			$0.00
MATHESON GARY	CON 1 PT LOT 21	271104000400400	400400	0.042			0.0000									$ -			$0.00
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	318010	0.012			0.0000									$ -			$0.00
NEUMANN GARY	CON 1 PT LOT 21	271104000400300	400300	0.000			0.0000									$ -			$0.00
City of Port Colborne	Lorraine Rd. ROW	Lorraine Rd. ROW		0.689															
				8.519					$ 3,510.25			$ -				$ 2,393.00	$ -	$ -	$5,903.25

Michener Branch #2

Owner	Legal Text	Roll No	ARN ABBREV	Area Ha	Land and Rights of Way: Length m	Top Width	Section 29 Allowance: Area, Ha	$	Work Zone: Work Access $	Damages: Length m	Section 30 Allowance: Area, Ha	$	For Existing Drain: From STN	To STN	Length, m	Section 31 Allowance $	Insufficient Outlet: Section 32 Allowance $	Loss of Access: Section 33 Allowance $	Total of Allowances $
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	318010	5.108								0							$0.00
PYE LAURIE LYNNE	CON 1 PT LOT 19 PT LOT 20	271104000314600	314600	3.545					$ -			0							$0.00
VALE CANADA LIMITED	CON 1 PT LOT 21	271104000405200	405200	2.799	337.0	1.900	0.0640	$ 1,582.21	$ 931.59	377	0.377	$ 1,621.10	0	377	377	$ 3,770			$7,904.90
NERO FELICE	CON 1 PT LOT 20	271104000318000	318000	2.431					$ -			0							$0.00
VAN KRALINGEN ALLERT	CON 1 PT LOT 20	271104000317900	317900	14.499					$ -			0							$0.00
City of Port Colborne	Lorraine Rd. ROW	Lorraine Rd. ROW	ROW	1.380					$ -			0							$0.00
VALE CANADA LIMITED	CON 1 PT LOT 21 PT LOT 22	271104000405100	405100	0.554					$ -			0							$0.00
ARSENAULT ROBERT EUGENE	CON 1 PT LOT 21	271104000405300	405300	0.154					$ -			0							$0.00
NIEUWLAND LUKE	CON 1 PT LOT 21	271104000405400	405400	0.096					$ -			0							$0.00
	CON 1 PT LOT 19 RP 59R12136;PARTS 1								$ -										$0.00
BANKERT DAVID ROY	AND	271104000314700	314700	0.075								0							
VALE CANADA LIMITED	CON 1 PT LOT 21 RP 59R9448;PART 1	271104000405000	405000	0.058					$ -			0							$0.00
ADAMS KEVIN JAMES	CON 1 PT LOT 21	271104000405500	405500	0.012					$ -			0							$0.00
				30.712					$ 2,513.80			$ 1,621.10				$ 3,770.00	$ -	$ -	$7,904.90

Michener Drain

* Section 30 Allowance for damages are based on construction impacts (damages) to cultivated fields only. Actual allowance to be calculated by site impact post construction.

Owner	Legal Text	Roll No	ARN ABBREV	Area Ha	Land and Rights of Way Length m	Top Width	Section 29 Allowance Area, Ha	$	Work Zone Work Access $	Damages Length m	Section 30 Allowance Area, Ha	$	For Existing Drain From STN	To STN	Length, m	Section 31 Allowance $	Insufficient Outlet Section 32 Allowance $	Loss of Access Section 33 Allowance $	Total of Allowances $
DOOLITTLE ROY W III	PLAN 19 LOT 23 LOT 24 NP778	271104000314300	314300	0.071															$0.00
HANNAH ELISABETH WANLESS	PLAN 19 PT LOT 25 PT LOT 26;NP778	271104000314500	314500	0.289															$0.00
PYE LAURIE LYNNE	CON 1 PT LOT 19 PT LOT 20	271104000314600	314600	12.371															$0.00
BANKERT DAVID ROY	CON 1 PT LOT 19 RP 59R12136;PARTS 1 AND	271104000314700	314700	3.874															$0.00
VANDEBELD GRACE ELIZABETH	CON 1 PT LOT 19 PT LOT 20	271104000315000	315000	5.156															$0.00
HOCKLEY BRENDA LEE	CON 1 PT LOT 20	271104000317825	317825	2.719															$0.00
GRIST WILLIAM JOSEPH	CON 1 PT LOT 20 RP59R 11429;PART 1	271104000317850	317850	0.406															$0.00
VAN KRALINGEN ALLERT	CON 1 PT LOT 20	271104000317900	317900	17.369															$0.00
NERO FELICE	CON 1 PT LOT 20	271104000318000	318000	2.431															$0.00
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	318010	5.120															$0.00
NIEUWLAND LIEUWE CORNELIS	CON 1 PT LOT 20 RP 59R5493;PART 1	271104000318100	318100	0.560															$0.00
O'HARA GREGORY G	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400100	400100	0.357															$0.00
LEON LOU ANN	HUMBERSTONE CON 1 PT LOT 21;PT WATER LOT	271104000400101	400101	0.532															$0.00
WEEBADUARACHCHIGE ASELA	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400102	400102	0.512															$0.00
DOOLITTLE ROY W III	CON 1 PT LOT 21	271104000400200	400200	0.357															$0.00
NEUMANN GARY	CON 1 PT LOT 21	271104000400300	400300	0.383															$0.00
FRAME JOHN DOUGLAS	CON 1 PT LOT 21 PLAN 59R;9880 PRTS 2 & 3	271104000400305	400305	0.382															$0.00
MATHESON GARY	CON 1 PT LOT 21	271104000400400	400400	0.413															$0.00
570466 ONTARIO LIMITED	HUMBERSTONE CON 1 PT LOT 22;RP 59R13926A	271104000404300	404300	0.000															$0.00
570466 ONTARIO LTD	CON 1 PT LOT 21	271104000404301	404301	4.787	403.5	5.0	0.202		$ 498.53	403.5	0.000	$0.00							$498.53
MASON MARTHA JEANNE	CON 1 PT LOT 21	271104000404303	404303	3.067															$0.00
LEON JOHN	CON 1 PT LOT 21	271104000404400	404400	0.442															$0.00
NICHOLLS LARRY JAMES	CON 1 PT LOT 21	271104000404500	404500	1.220															$0.00
WINGER LLOYD JAMES JUNIOR	CON 1 PT LOT 21	271104000404600	404600	0.848															$0.00
RIVANDO CHRISTOPHER ANTHONY	CON 1 PT LOT 21 PLAN 59R6790;PART 1	271104000404601	404601	0.405															$0.00
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 21 PT LOT 22 RP;59R8112 PAR	271104000404700	404700	18.764	287.8	5.0	0.144		$ 355.58	287.8	0.000	$0.00							$355.58
SPITERI CHARLES	CON 1 PT LOT 21	271104000404800	404800	9.586	251.7	5.0	0.126		$ 310.98	251.7	0.252	$310.98							$621.96
TALBOT JASON JONATHAN ARTHUR	CON 1 PT LOT 21	271104000404900	404900	0.316					$ -										$0.00
VALE CANADA LIMITED	CON 1 PT LOT 21 RP 59R9448;PART 1	271104000405000	405000	0.347					$ -										$0.00
VALE CANADA LIMITED	CON 1 PT LOT 21 PT LOT 22	271104000405100	405100	10.514	259	5.0	0.130		$ 320.00	259	0.259	$320.00							$640.00
VALE CANADA LIMITED	CON 1 PT LOT 21	271104000405200	405200	7.756	193.5	5.0	0.097		$ 239.07	193.5	0.194	$239.07							$478.15
ARSENAULT ROBERT EUGENE	CON 1 PT LOT 21	271104000405300	405300	0.236					$ -										$0.00
NIEUWLAND LUKE	CON 1 PT LOT 21	271104000405400	405400	0.340					$ -										$0.00
ADAMS KEVIN JAMES	CON 1 PT LOT 21	271104000405500	405500	9.204	249.5	5.0	0.125		$ 308.26	249.5	0.250	$308.26							$616.53
PORT COLBORNE CITY	PT LOT 21 CON 1 RP 59R10301;PARTS 2 AND	271104000405600	405600	2.300	61	5.0	0.031		$ 75.37	61	0.061	$75.37							$150.73
PORT COLBORNE CITY	PT LOT 21 CON 1 RP 59R10301;PARTS 2 AND	271104000405600	405600	2.026															$0.00
MOSKALYK JOHN JOSEPH	CON 1 PT LOT 21	271104000405700	405700	2.285															$0.00
LEON LOU ANN	CON 1 PT LOT 21 RP 59R13013;PART 1	271104000417902	417902	0.580															$0.00
PORT COLBORNE CITY	CON 1 PT LOTS 1-22	271104000499900	499900	1.599															$0.00
PORT COLBORNE CITY	CON 1 PT LOTS 1-22	271104000499900	499900	0.688															$0.00
City of Port Colborne	Lorraine Rd. from Lake to Killaly St. East	Lorraine Rd. ROW		3.250															$0.00
City of Port Colborne	Lakeshore Rd. East west of Lorraine	Lakeshore Rd. E ROW		0.563															$0.00
City of Port Colborne	Weaver Rd. N of Friendship Trail	Weaver Rd. ROW		0.121															$0.00
				111.590					$2,107.81			$1,253.69							$3,361.49

Drain Allowance Total $17,169.64

Michener Municipal Drain
City of Port Colborne
Regional Municipality of Niagara

23.3
2 yr avg. Intensity
for a 1 hour storm

Section 23 Outlet Benefit / Outlet Liability

Owner	Legal Text	Roll No	ARN ABBREV	Area Ha	Soil Type	Gradient	Land Factor	Runoff Factor 'C'	QRF	SWM	SWMF	QRF-SWMF	QRF Ratio	Michener Branch #1 $ 29,827.28	QRF Ratio	Michener Branch #2 $ 26,463.48	QRF Ratio	Michener Drain $ 119,512.13	Total Section 23 Assessment
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 21 PT LOT 22 RP;59R8112 PAR	271104000404700	404700	2.176	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	COMMERCIAL	25	3.55	0	0	3.55	0.2044	$ 6,096					$ 6,096
NICHOLLS LARRY JAMES	CON 1 PT LOT 21	271104000404500	404500	1.201	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	20	1.57	0	0	1.57	0.0902	$ 2,691					$ 2,691
City of Port Colborne	Lakeshore Rd. East ROW	ROW	ROW	0.556	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	ROW - paved 2 lane	85	3.08	0	0	3.08	0.1775	$ 5,295					$ 5,295
WINGER LLOYD JAMES JUNIOR	CON 1 PT LOT 21	271104000404600	404600	0.848	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	15	0.83	0	0	0.83	0.0478	$ 1,424					$ 1,424
MASON MARTHA JEANNE	CON 1 PT LOT 21	271104000404303	404303	0.729	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	20	0.95	0	0	0.95	0.0548	$ 1,634					$ 1,634
NIEUWLAND LIEUWE CORNELIS	CON 1 PT LOT 20 RP 59R5493;PART 1	271104000318100	318100	0.560	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	20	0.73	0	0	0.73	0.0421	$ 1,255					$ 1,255
LEON LOU ANN	CON 1 PT LOT 21 RP 59R13013;PART 1	271104000417902	417902	0.517	NM - Sandy well drained	0.20%	LAND	12	0.41	0	0	0.41	0.0233	$ 696					$ 696
RIVANDO CHRISTOPHER ANTHONY	CON 1 PT LOT 21 PLAN 59R6790;PART 1	271104000404601	404601	0.405	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	15	0.40	0	0	0.40	0.0228	$ 680					$ 680
DOOLITTLE ROY W III	CON 1 PT LOT 21	271104000400200	400200	0.357	NM - Sandy well drained	0.20%	LAND	12	0.28	0	0	0.28	0.0161	$ 480					$ 480
O'HARA GREGORY G	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400100	400100	0.295	NM - Sandy well drained	0.20%	RESIDENTIAL	20	0.38	0	0	0.38	0.0221	$ 661					$ 661
HANNAH ELISABETH WANLESS	PLAN 19 PT LOT 25 PT LOT 26;NP778	271104000314500	314500	0.289	NM - Sandy well drained	0.20%	RESIDENTIAL	20	0.38	0	0	0.38	0.0217	$ 647					$ 647
LEON JOHN	CON 1 PT LOT 21	271104000404400	404400	0.205	NM - Sandy well drained	0.20%	RESIDENTIAL	20	0.27	0	0	0.27	0.0154	$ 460					$ 460
WEEBADUARACHCHIGE ASELA	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400102	400102	0.134	NM - Sandy well drained	0.20%	RESIDENTIAL	20	0.17	0	0	0.17	0.0101	$ 300					$ 300
LEON LOU ANN	HUMBERSTONE CON 1 PT LOT 21;PT WATER LOT	271104000400101	400101	0.122	NM - Sandy well drained	0.20%	RESIDENTIAL	20	0.16	0	0	0.16	0.0091	$ 273					$ 273
DOOLITTLE ROY W III	PLAN 19 LOT 23 LOT 24 NP778	271104000314300	314300	0.071	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	20	0.09	0	0	0.09	0.0053	$ 159					$ 159
MATHESON GARY	CON 1 PT LOT 21	271104000400400	400400	0.042	NM - Sandy well drained	0.20%	RESIDENTIAL	20	0.05	0	0	0.05	0.0032	$ 94					$ 94
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	318010	0.012	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	COMMERCIAL	25	0.02	0	0	0.02	0.0011	$ 33					$ 33
NEUMANN GARY	CON 1 PT LOT 21	271104000400300	400300	0.000	NM - Sandy well drained	0.20%	RESIDENTIAL	20	0.00	0	0	0.00	0.0000	$ 1					$ 1
City of Port Colborne	Lorraine Rd. ROW	Lorraine Rd. ROW		0.689		0.20%		90	4.05	0	0	4.05	0.2329	$ 6,948					$ 6,948
				9.208					17.37	0.00	0.00	17.37	1.00	$ 29,827					
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	318010	5.108	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	COMMERCIAL	17	5.67	0	0	5.67			0.0861	$ 2,278			$ 2,278
PYE LAURIE LYNNE	CON 1 PT LOT 19 PT LOT 20	271104000314600	314600	3.545	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	FARM	35	8.09	0	0	8.09			0.1230	$ 3,255			$ 3,255
VALE CANADA LIMITED	CON 1 PT LOT 21	271104000405200	405200	2.799	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	FARM	35	6.39	0	0	6.39			0.0971	$ 2,570			$ 2,570
NERO FELICE	CON 1 PT LOT 20	271104000318000	318000	2.431	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	RESIDENTIAL	45	7.14	0	0	7.14			0.1085	$ 2,871			$ 2,871
VAN KRALINGEN ALLERT	CON 1 PT LOT 20	271104000317900	317900	14.499	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	FARM	30	28.38	0	0	28.38			0.4312	$ 11,412			$ 11,412
City of Port Colborne	Lorraine Rd. ROW	Lorraine Rd. ROW	ROW	1.380	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	ROW - paved 2 lane	90	8.10	0	0	8.10			0.1231	$ 3,258			$ 3,258
VALE CANADA LIMITED	CON 1 PT LOT 21 PT LOT 22	271104000405100	405100	0.554	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	LAND	28	1.01	0	0	1.01			0.0154	$ 407			$ 407
ARSENAULT ROBERT EUGENE	CON 1 PT LOT 21	271104000405300	405300	0.154	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	RESIDENTIAL	45	0.45	0	0	0.45			0.0069	$ 182			$ 182
NIEUWLAND LUKE	CON 1 PT LOT 21	271104000405400	405400	0.096	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	RESIDENTIAL	45	0.28	0	0	0.28			0.0043	$ 114			$ 114
BANKERT DAVID ROY	CON 1 PT LOT 19 RP 59R12136;PARTS 1 AND	271104000314700	314700	0.075	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	FARM	30	0.15	0	0	0.15			0.0022	$ 59			$ 59
VALE CANADA LIMITED	CON 1 PT LOT 21 RP 59R9448;PART 1	271104000405000	405000	0.058	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	LAND	28	0.11	0	0	0.11			0.0016	$ 43			$ 43
ADAMS KEVIN JAMES	CON 1 PT LOT 21	271104000405500	405500	0.012	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	FARM	45	0.04	0	0	0.04			0.0005	$ 14			$ 14
									0.00	0.00	0.00	0.00			0.0000	$ -			$ -
				30.712					65.80	0.00	0.00	65.80			1.00	$ 26,463			

Owner	Legal Text	Roll No	ARN ABBREV	Area Ha	Soil Type	Gradient	Land Factor	Runoff Factor 'C'	QRF	SWM	SWMF	QRF-SWMF	QRF Ratio	Michener Branch #1 $ 29,827.28	QRF Ratio	Michener Branch #2 $ 26,463.48	QRF Ratio	Michener Drain $ 119,512.13	Total Section 23 Assessment
DOOLITTLE ROY W III	PLAN 19 LOT 23 LOT 24 NP778	271104000314300	314300	0.071	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	35	0.16	0	0	0.16					0.0005	$ 57	$ 57
HANNAH ELISABETH WANLESS	PLAN 19 PT LOT 25 PT LOT 26;NP778	271104000314500	314500	0.289	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	35	0.66	0	0	0.66					0.0019	$ 229	$ 229
PYE LAURIE LYNNE	CON 1 PT LOT 19 PT LOT 20	271104000314600	314600	12.371	NM - Sandy well drained	0.20%	FARM	35	28.25	0	0	28.25					0.0822	$ 9,828	$ 9,828
BANKERT DAVID ROY	CON 1 PT LOT 19 RP 59R12136;PARTS 1 AND	271104000314700	314700	3.874	NM - Sandy well drained	0.20%	FARM	35	8.85	0	0	8.85					0.0257	$ 3,077	$ 3,077
VANDEBELD GRACE ELIZABETH	CON 1 PT LOT 19 PT LOT 20	271104000315000	315000	5.156	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	FARM	37	12.45	0	0	12.45					0.0362	$ 4,331	$ 4,331
HOCKLEY BRENDA LEE	CON 1 PT LOT 20	271104000317825	317825	2.719	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	FARM	37	6.56	0	0	6.56					0.0191	$ 2,284	$ 2,284
GRIST WILLIAM JOSEPH	CON 1 PT LOT 20 RP59R 11429;PART 1	271104000317850	317850	0.406	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	RESIDENTIAL	37	0.98	0	0	0.98					0.0029	$ 341	$ 341
VAN KRALINGEN ALLERT	CON 1 PT LOT 20	271104000317900	317900	17.369	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	FARM	35	39.66	0	0	39.66					0.1155	$ 13,798	$ 13,798
NERO FELICE	CON 1 PT LOT 20	271104000318000	318000	2.431	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	RESIDENTIAL	30	4.76	0	0	4.76					0.0139	$ 1,656	$ 1,656
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	318010	5.120	NM - Sandy well drained	0.20%	COMMERCIAL	28	9.35	0	0	9.35					0.0272	$ 3,254	$ 3,254
NIEUWLAND LIEUWE CORNELIS	CON 1 PT LOT 20 RP 59R5493;PART 1	271104000318100	318100	0.560	NM - Sandy well drained	0.20%	RESIDENTIAL	28	1.02	0	0	1.02					0.0030	$ 356	$ 356
O'HARA GREGORY G	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400100	400100	0.357	NM - Sandy well drained	0.20%	RESIDENTIAL	28	0.65	0	0	0.65					0.0019	$ 227	$ 227
LEON LOU ANN	HUMBERSTONE CON 1 PT LOT 21;PT WATER LOT	271104000400101	400101	0.532	NM - Sandy well drained	0.20%	RESIDENTIAL	28	0.97	0	0	0.97					0.0028	$ 338	$ 338
WEEBADUARACHCHIGE ASELA	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400102	400102	0.512	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	RESIDENTIAL	32	1.07	0	0	1.07					0.0031	$ 372	$ 372
DOOLITTLE ROY W III	CON 1 PT LOT 21	271104000400200	400200	0.357	NM - Sandy well drained	0.20%	LAND	28	0.65	0	0	0.65					0.0019	$ 227	$ 227
NEUMANN GARY	CON 1 PT LOT 21	271104000400300	400300	0.383	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	RESIDENTIAL	65	1.62	0	0	1.62					0.0047	$ 565	$ 565
FRAME JOHN DOUGLAS	CON 1 PT LOT 21 PLAN 59R;9880 PRTS 2 & 3	271104000400305	400305	0.382	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	RESIDENTIAL	65	1.62	0	0	1.62					0.0047	$ 563	$ 563
MATHESON GARY	CON 1 PT LOT 21	271104000400400	400400	0.413	Welland (WLL) - mainly reddish-hued lacustrine heavy clay - Poor Drainage - Orthic Humic Gleyshol / Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	45	1.21	0	0	1.21					0.0035	$ 422	$ 422
570466 ONTARIO LIMITED	HUMBERSTONE CON 1 PT LOT 22;RP 59R13926A	271104000404300	404300	0.000	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	LAND	45	0.00	0	0	0.00					0.0000	$ 0	$ 0
570466 ONTARIO LTD	CON 1 PT LOT 21	271104000404301	404301	4.787	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	LAND	45	14.05	0	0	14.05					0.0409	$ 4,889	$ 4,889
MASON MARTHA JEANNE	CON 1 PT LOT 21	271104000404303	404303	3.067	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	RESIDENTIAL	45	9.00	0	0	9.00					0.0262	$ 3,132	$ 3,132
LEON JOHN	CON 1 PT LOT 21	271104000404400	404400	0.442	Welland (WLL) - mainly reddish-hued lacustrine heavy clay - Poor Drainage - Orthic Humic Gleyshol	0.20%	RESIDENTIAL	40	1.15	0	0	1.15					0.0034	$ 401	$ 401
NICHOLLS LARRY JAMES	CON 1 PT LOT 21	271104000404500	404500	1.220	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	RESIDENTIAL	35	2.79	0	0	2.79					0.0081	$ 969	$ 969
WINGER LLOYD JAMES JUNIOR	CON 1 PT LOT 21	271104000404600	404600	0.848	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	RESIDENTIAL	35	1.94	0	0	1.94					0.0056	$ 673	$ 673
RIVANDO CHRISTOPHER ANTHONY	CON 1 PT LOT 21 PLAN 59R6790;PART 1	271104000404601	404601	0.405	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	RESIDENTIAL	45	1.19	0	0	1.19					0.0035	$ 413	$ 413
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 21 PT LOT 22 RP;59R8112 PAR	271104000404700	404700	18.764	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	COMMERCIAL	37	45.30	0	0	45.30					0.1319	$ 15,759	$ 15,759
SPITERI CHARLES	CON 1 PT LOT 21	271104000404800	404800	9.586	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	FARM	45	28.14	0	0	28.14					0.0819	$ 9,792	$ 9,792
TALBOT JASON JONATHAN ARTHUR	CON 1 PT LOT 21	271104000404900	404900	0.316	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	RESIDENTIAL	45	0.93	0	0	0.93					0.0027	$ 323	$ 323
VALE CANADA LIMITED	CON 1 PT LOT 21 RP 59R9448;PART 1	271104000405000	405000	0.347	Chinguacousy (CGU4) - Mainly clay loam till - Imperfect draining - Gleyed Brunisolic Gray Brown Luvisol	0.20%	LAND	45	1.02	0	0	1.02					0.0030	$ 355	$ 355
VALE CANADA LIMITED	CON 1 PT LOT 21 PT LOT 22	271104000405100	405100	10.514	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	LAND	45	30.87	0	0	30.87					0.0899	$ 10,739	$ 10,739
VALE CANADA LIMITED	CON 1 PT LOT 21	271104000405200	405200	7.756	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	FARM	37	18.72	0	0	18.72					0.0545	$ 6,513	$ 6,513
ARSENAULT ROBERT EUGENE	CON 1 PT LOT 21	271104000405300	405300	0.236	Farmington (FRM) - 10 to 20cm variable textures over mainly limestone and dolostone bedrock - Rapid Draining - Orthic Melanic Brunisol	0.20%	RESIDENTIAL	37	0.57	0	0	0.57					0.0017	$ 198	$ 198
NIEUWLAND LUKE	CON 1 PT LOT 21	271104000405400	405400	0.340	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	RESIDENTIAL	37	0.82	0	0	0.82					0.0024	$ 286	$ 286
ADAMS KEVIN JAMES	CON 1 PT LOT 21	271104000405500	405500	9.204	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	FARM	37	22.22	0	0	22.22					0.0647	$ 7,730	$ 7,730
PORT COLBORNE CITY	PT LOT 21 CON 1 RP 59R10301;PARTS 2 AND	271104000405600	405600	2.300	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	LAND	37	5.55	0	0	5.55					0.0162	$ 1,931	$ 1,931
PORT COLBORNE CITY	PT LOT 21 CON 1 RP 59R10301;PARTS 2 AND	271104000405600	405600	2.026	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	LAND	37	4.89	0	0	4.89					0.0142	$ 1,702	$ 1,702
MOSKALYK JOHN JOSEPH	CON 1 PT LOT 21	271104000405700	405700	2.285	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	FARM	37	5.52	0	0	5.52					0.0161	$ 1,919	$ 1,919
LEON LOU ANN	CON 1 PT LOT 21 RP 59R13013;PART 1	271104000417902	417902	0.580	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	LAND	37	1.40	0	0	1.40					0.0041	$ 487	$ 487
PORT COLBORNE CITY	CON 1 PT LOTS 1-22	271104000499900	499900	1.599	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	INDUSTRIAL	37	3.86	0	0	3.86					0.0112	$ 1,343	$ 1,343
PORT COLBORNE CITY	CON 1 PT LOTS 1-22	271104000499900	499900	0.688	Jeddo (JDD) - Mainly Clay Loam Till - Poor Draining - Humic Luvic Gleysol	0.20%	INDUSTRIAL	37	1.66	0	0	1.66					0.0048	$ 578	$ 578
City of Port Colborne	Lorraine Rd. from Lake to Killaly St. East	Lorraine Rd. ROW		3.250		0.20%		83	17.60	0	0	17.60					0.0512	$ 6,122	$ 6,122
City of Port Colborne	Lakeshore Rd. East west of Lorraine	Lakeshore Rd. E ROW		0.563		0.20%		84	3.08	0	0	3.08					0.0090	$ 1,073	$ 1,073
City of Port Colborne	Weaver Rd. N of Friendship Trail	Weaver Rd. ROW		0.121		0.20%		95	0.75	0	0	0.75					0.0022	$ 261	$ 261
				134.55								343.51					1.0000	$ 119,512	$ 175,803
				134.59														$ 175,803	

Michener Municipal Drain
City of Port Colborne
Regional Municipality of Niagara

Drain Assessment Summary Table

				Benefits realized from drainage improvements	23(1) Outlet Liability for right of drainage. 23(2) Injuring liability of discharge	Additional works or features above the base functioning of the Drain System	Roads & Utilities assessed the actual cost of additional works.			
Michener Branch #1										
Owner	Legal Text	Roll No	Area Ha	Benefit Section 22	Outlet Liability Section 23	Special Benefit Section 24	Special Assessment Section 26	Total Assessment	Total Allowance	Net
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 21 PT LOT 22 RP;59R8112 PAR	271104000404700	2.176	$237.50	$6,096.20	$0.00	$0.00	$6,333.70	$1,077.23	$5,256.47
NICHOLLS LARRY JAMES	CON 1 PT LOT 21	271104000404500	1.201	$975.00	$2,691.00	$0.00	$0.00	$3,666.00	$2,842.74	$823.26
City of Port Colborne	Lakeshore Rd. East ROW	ROW	0.556	$535.00	$5,294.96	$0.00	$6,590.43	$12,420.38	$0.00	$12,420.38
WINGER LLOYD JAMES JUNIOR	CON 1 PT LOT 21	271104000404600	0.848	$430.50	$1,424.32	$0.00	$0.00	$1,854.82	$0.00	$1,854.82
MASON MARTHA JEANNE	CON 1 PT LOT 21	271104000404303	0.729	$200.00	$1,634.46	$0.00	$0.00	$1,834.46	$1,590.74	$243.73
NIEUWLAND LIEUWE CORNELIS	CON 1 PT LOT 20 RP 59R5493;PART 1	271104000318100	0.560	$0.00	$1,255.02	$0.00	$0.00	$1,255.02	$0.00	$1,255.02
LEON LOU ANN	CON 1 PT LOT 21 RP 59R13013;PART 1	271104000417902	0.517	$0.00	$695.64	$0.00	$0.00	$695.64	$0.00	$695.64
RIVANDO CHRISTOPHER ANTHONY	CON 1 PT LOT 21 PLAN 59R6790;PART 1	271104000404601	0.405	$45.00	$680.10	$0.00	$0.00	$725.10	$0.00	$725.10
DOOLITTLE ROY W III	CON 1 PT LOT 21	271104000400200	0.357	$280.00	$479.76	$0.00	$0.00	$759.76	$0.00	$759.76
O'HARA GREGORY G	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400100	0.295	$0.00	$660.60	$0.00	$0.00	$660.60	$0.00	$660.60
HANNAH ELISABETH WANLESS	PLAN 19 PT LOT 25 PT LOT 26;NP778	271104000314500	0.289	$0.00	$647.01	$0.00	$0.00	$647.01	$0.00	$647.01
LEON JOHN	CON 1 PT LOT 21	271104000404400	0.205	$70.00	$459.96	$0.00	$0.00	$529.96	$392.54	$137.42
WEEBADUARACHCHIGE ASELA	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400102	0.134	$82.50	$300.46	$0.00	$0.00	$382.96	$0.00	$382.96
LEON LOU ANN	HUMBERSTONE CON 1 PT LOT 21;PT WATER LOT	271104000400101	0.122	$37.50	$272.75	$0.00	$0.00	$310.25	$0.00	$310.25
DOOLITTLE ROY W III	PLAN 19 LOT 23 LOT 24 NP778	271104000314300	0.071	$150.00	$159.39	$0.00	$0.00	$309.39	$0.00	$309.39
MATHESON GARY	CON 1 PT LOT 21	271104000400400	0.042	$22.50	$94.24	$0.00	$0.00	$116.74	$0.00	$116.74
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	0.012	$0.00	$33.13	$0.00	$0.00	$33.13	$0.00	$33.13
NEUMANN GARY	CON 1 PT LOT 21	271104000400300	0.000	$0.00	$0.75	$0.00	$0.00	$0.75	$0.00	$0.75
City of Port Colborne	Lorraine Rd. ROW	Lorraine Rd. ROW	0.689	$607.50	$6,947.53	$0.00	$0.00	$7,555.03	$0.00	$7,555.03
Enbridge							$2,000.00	$2,000.00		$2,000.00
				$3,065.50	$22,879.76	$0.00	$8,590.43	$42,090.71	$5,903.25	$36,187.46
Michener Branch #2										
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	5.108	$0.00	$2,278.34	$0.00	$0.00	$2,278.34	$0.00	$2,278.34
PYE LAURIE LYNNE	CON 1 PT LOT 19 PT LOT 20	271104000314600	3.545	$0.00	$3,255.29	$0.00	$0.00	$3,255.29	$0.00	$3,255.29
VALE CANADA LIMITED	CON 1 PT LOT 21	271104000405200	2.799	$845.00	$2,570.32	$0.00	$0.00	$3,415.32	$7,904.90	-$4,489.58
NERO FELICE	CON 1 PT LOT 20	271104000318000	2.431	$0.00	$2,870.63	$0.00	$0.00	$2,870.63	$0.00	$2,870.63
VAN KRALINGEN ALLERT	CON 1 PT LOT 20	271104000317900	14.499	$0.00	$11,411.96	$0.00	$0.00	$11,411.96	$0.00	$11,411.96
City of Port Colborne	Lorraine Rd. ROW	Lorraine Rd. ROW	1.380	$4,000.00	$3,257.92	$0.00	$0.00	$7,257.92	$0.00	$7,257.92
VALE CANADA LIMITED	CON 1 PT LOT 21 PT LOT 22	271104000405100	0.554	$0.00	$407.12	$0.00	$0.00	$407.12	$0.00	$407.12
ARSENAULT ROBERT EUGENE	CON 1 PT LOT 21	271104000405300	0.154	$0.00	$181.95	$0.00	$0.00	$181.95	$0.00	$181.95
NIEUWLAND LUKE	CON 1 PT LOT 21	271104000405400	0.096	$0.00	$113.61	$0.00	$0.00	$113.61	$0.00	$113.61
BANKERT DAVID ROY	CON 1 PT LOT 19 RP 59R12136;PARTS 1 AND	271104000314700	0.075	$0.00	$59.15	$0.00	$0.00	$59.15	$0.00	$59.15
VALE CANADA LIMITED	CON 1 PT LOT 21 RP 59R9448;PART 1	271104000405000	0.058	$0.00	$42.93	$0.00	$0.00	$42.93	$0.00	$42.93
ADAMS KEVIN JAMES	CON 1 PT LOT 21	271104000405500	0.012	$0.00	$14.26	$0.00	$0.00	$14.26	$0.00	$14.26
				$4,845.00	$26,463.48	$0.00	$0.00	$31,308.48	$7,904.90	$23,403.58

Owner	Legal Text	Roll No	Area Ha	Benefit Section 22	Outlet Liability Section 23	Special Benefit Section 24	Special Assessment Section 26	Total Assessment	Total Allowance	Net
Michener Drain										
DOOLITTLE ROY W III	PLAN 19 LOT 23 LOT 24 NP778	271104000314300	0.07	$0.00	$56.51	$0.00		$56.51	$0.00	$56.51
HANNAH ELISABETH WANLESS	PLAN 19 PT LOT 25 PT LOT 26;NP778	271104000314500	0.29	$0.00	$229.39	$0.00		$229.39	$0.00	$229.39
PYE LAURIE LYNNE	CON 1 PT LOT 19 PT LOT 20	271104000314600	12.37	$0.00	$9,827.62	$0.00		$9,827.62	$0.00	$9,827.62
BANKERT DAVID ROY	CON 1 PT LOT 19 RP 59R12136;PARTS 1 AND	271104000314700	3.87	$0.00	$3,077.43	$0.00		$3,077.43	$0.00	$3,077.43
VANDEBELD GRACE ELIZABETH	CON 1 PT LOT 19 PT LOT 20	271104000315000	5.16	$0.00	$4,330.51	$0.00		$4,330.51	$0.00	$4,330.51
HOCKLEY BRENDA LEE	CON 1 PT LOT 20	271104000317825	2.72	$0.00	$2,283.72	$0.00		$2,283.72	$0.00	$2,283.72
GRIST WILLIAM JOSEPH	CON 1 PT LOT 20 RP59R 11429;PART 1	271104000317850	0.41	$0.00	$340.77	$0.00		$340.77	$0.00	$340.77
VAN KRALINGEN ALLERT	CON 1 PT LOT 20	271104000317900	17.37	$0.00	$13,798.07	$0.00		$13,798.07	$0.00	$13,798.07
NERO FELICE	CON 1 PT LOT 20	271104000318000	2.43	$0.00	$1,655.63	$0.00		$1,655.63	$0.00	$1,655.63
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 20	271104000318010	5.12	$0.00	$3,253.93	$0.00		$3,253.93	$0.00	$3,253.93
NIEUWLAND LIEUWE CORNELIS	CON 1 PT LOT 20 RP 59R5493;PART 1	271104000318100	0.56	$0.00	$355.95	$0.00		$355.95	$0.00	$355.95
O'HARA GREGORY G	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400100	0.36	$0.00	$226.97	$0.00		$226.97	$0.00	$226.97
LEON LOU ANN	HUMBERSTONE CON 1 PT LOT 21;PT WATER LOT	271104000400101	0.53	$0.00	$338.24	$0.00		$338.24	$0.00	$338.24
WEEBADUARACHCHIGE ASELA	CON 1 PT LOT 21 PT WATER LOT;RP 59R5808	271104000400102	0.51	$0.00	$372.04	$0.00		$372.04	$0.00	$372.04
DOOLITTLE ROY W III	CON 1 PT LOT 21	271104000400200	0.36	$0.00	$226.78	$0.00		$226.78	$0.00	$226.78
NEUMANN GARY	CON 1 PT LOT 21	271104000400300	0.38	$0.00	$565.02	$0.00		$565.02	$0.00	$565.02
FRAME JOHN DOUGLAS	CON 1 PT LOT 21 PLAN 59R;9880 PRTS 2 & 3	271104000400305	0.38	$0.00	$563.01	$0.00		$563.01	$0.00	$563.01
MATHESON GARY	CON 1 PT LOT 21	271104000400400	0.41	$0.00	$421.91	$0.00		$421.91	$0.00	$421.91
570466 ONTARIO LIMITED	HUMBERSTONE CON 1 PT LOT 22;RP 59R13926A	271104000404300	0.00	$0.00	$0.35	$0.00		$0.35	$0.00	$0.35
570466 ONTARIO LTD	CON 1 PT LOT 21	271104000404301	4.79	$0.00	$4,889.09	$0.00		$4,889.09	$498.53	$4,390.55
MASON MARTHA JEANNE	CON 1 PT LOT 21	271104000404303	3.07	$0.00	$3,132.24	$0.00		$3,132.24	$0.00	$3,132.24
LEON JOHN	CON 1 PT LOT 21	271104000404400	0.44	$0.00	$400.99	$0.00		$400.99	$0.00	$400.99
NICHOLLS LARRY JAMES	CON 1 PT LOT 21	271104000404500	1.22	$0.00	$969.43	$0.00		$969.43	$0.00	$969.43
WINGER LLOYD JAMES JUNIOR	CON 1 PT LOT 21	271104000404600	0.85	$0.00	$673.28	$0.00		$673.28	$0.00	$673.28
RIVANDO CHRISTOPHER ANTHONY	CON 1 PT LOT 21 PLAN 59R6790;PART 1	271104000404601	0.40	$0.00	$413.34	$0.00		$413.34	$0.00	$413.34
WHISKEY RUN GOLF CLUB LTD	CON 1 PT LOT 21 PT LOT 22 RP;59R8112 PAR	271104000404700	18.76	$0.00	$15,758.71	$4,110.00		$19,868.71	$355.58	$19,513.13
SPITERI CHARLES	CON 1 PT LOT 21	271104000404800	9.59	$0.00	$9,791.54	$1,250.00		$11,041.54	$621.96	$10,419.57
TALBOT JASON JONATHAN ARTHUR	CON 1 PT LOT 21	271104000404900	0.32	$0.00	$322.57	$0.00		$322.57	$0.00	$322.57
VALE CANADA LIMITED	CON 1 PT LOT 21 RP 59R9448;PART 1	271104000405000	0.35	$0.00	$354.83	$0.00		$354.83	$0.00	$354.83
VALE CANADA LIMITED	CON 1 PT LOT 21 PT LOT 22	271104000405100	10.51	$0.00	$10,739.09	$0.00		$10,739.09	$640.00	$10,099.09
VALE CANADA LIMITED	CON 1 PT LOT 21	271104000405200	7.76	$0.00	$6,513.21	$0.00		$6,513.21	$478.15	$6,035.06
ARSENAULT ROBERT EUGENE	CON 1 PT LOT 21	271104000405300	0.24	$0.00	$198.39	$0.00		$198.39	$0.00	$198.39
NIEUWLAND LUKE	CON 1 PT LOT 21	271104000405400	0.34	$0.00	$285.60	$0.00		$285.60	$0.00	$285.60
ADAMS KEVIN JAMES	CON 1 PT LOT 21	271104000405500	9.20	$0.00	$7,730.08	$750.00		$8,480.08	$616.53	$7,863.55
PORT COLBORNE CITY	PT LOT 21 CON 1 RP 59R10301;PARTS 2 AND	271104000405600	2.30	$0.00	$1,931.27	$0.00		$1,931.27	$150.73	$1,780.54
PORT COLBORNE CITY	PT LOT 21 CON 1 RP 59R10301;PARTS 2 AND	271104000405600	2.03	$0.00	$1,701.64	$0.00		$1,701.64	$0.00	$1,701.64
MOSKALYK JOHN JOSEPH	CON 1 PT LOT 21	271104000405700	2.28	$0.00	$1,918.87	$0.00		$1,918.87	$0.00	$1,918.87
LEON LOU ANN	CON 1 PT LOT 21 RP 59R13013;PART 1	271104000417902	0.58	$0.00	$487.41	$0.00		$487.41	$0.00	$487.41
PORT COLBORNE CITY	CON 1 PT LOTS 1-22	271104000499900	1.60	$0.00	$1,342.85	$0.00		$1,342.85	$0.00	$1,342.85
PORT COLBORNE CITY	CON 1 PT LOTS 1-22	271104000499900	0.69	$0.00	$578.02	$0.00		$578.02	$0.00	$578.02
City of Port Colborne	Lorraine Rd. from Lake to Killaly St. East	Lorraine Rd. ROW	3.25	$0.00	$6,122.37	$0.00		$6,122.37	$0.00	$6,122.37
City of Port Colborne	Lakeshore Rd. East west of Lorraine	Lakeshore Rd. E ROW	0.56	$0.00	$1,072.56	$0.00		$1,072.56	$0.00	$1,072.56
City of Port Colborne	Weaver Rd. N of Friendship Trail	Weaver Rd. ROW	0.12	$0.00	$260.91	$0.00		$260.91	$0.00	$260.91
				$0.00	$119,512.13	$6,110.00	$0.00	$125,622.13	$3,361.49	$122,260.64

Appendix D:

Supplementary Information

City of Port Colborne
Regular Council Meeting 18-18
Minutes

Date: July 23, 2018

Time: 7:32 p.m.

Place: Council Chambers, Municipal Offices, 66 Charlotte Street, Port Colborne

Members Present: R. Bodner, Councillor
B. Butters, Councillor
F. Danch, Councillor
A. Desmarais, Councillor
D. Elliott, Councillor
B. Kenny, Councillor
J. Maloney, Mayor (presiding officer)

Absent: Y. Doucet, Councillor (due to vacation)
J. Mayne, Councillor (leave of absence)

Staff Present: D. Aquilina, Director of Planning and Development
T. Cartwright, Fire Chief
A. Grigg, Director of Community and Economic Development
N. Halasz, Manager of Parks and Recreation
A. LaPointe, Manager of Legislative Services/City Clerk (minutes)
C. Lee, Director of Engineering and Operations
S. Luey, Chief Administrative Officer
P. Senese, Director of Corporate Services

Also in attendance were interested citizens, members of the news media and WeeStreem.

1. **Call to Order:**

Mayor Maloney called the meeting to order.

2. **Introduction of Addendum Items:**

Nil.

3. **Confirmation of Agenda:**

No. 110 Moved by Councillor R. Bodner
Seconded by Councillor A. Desmarais

That the agenda dated July 23, 2018 be confirmed, as circulated or as amended.

CARRIED.

4. **Disclosures of Interest:**

Nil.

5. **Adoption of Minutes:**

No. 111 Moved by Councillor B. Kenny
Seconded by Councillor A. Desmarais

(a) That the minutes of the special meeting of Council 16-18, July 9, 2018, be approved as presented.
(b) That the minutes of the regular meeting of Council 17-18, July 9, 2017, be approved as presented.

CARRIED.

6. Determination of Items Requiring Separate Discussion:

Nil.

7. Approval of Items Not Requiring Separate Discussion:

No. 112 Moved by Councillor F. Danch
Seconded by Councillor B. Butters

That items 1 to 7 on the agenda be approved, with the exception of items that have been deferred, deleted or listed for separate discussion, and the recommendation contained therein adopted.

Motions Arising from Committee of the Whole Meeting Delegations:

Dianna M. Carle regarding a request for an exemption to By-law 1117/64/81, Section 3.2.2 for 1056 Steele Street to Allow for a Second Curb/Driveway Cut

Council resolved:

That an exemption of By-law 1117/64/81, Section 3.2.2, for 1056 Steele Street be granted to allow for a second curb cut and driveway.

Items:

1. Planning and Development Department, Planning Division, Report 2018-105, Subject: Recommendation Report for Official Plan Amendment D09-01-18 & Zoning By-law Amendment D14-02-18, n/s Killaly Street West

Council resolved:

That the Official Plan Amendment attached to Planning and Development Department, Planning Division Report 2018-105 as Appendix A be approved, adding a special policy to the Highway Commercial designation to support the use of warehousing on the property; and

That the Zoning By-law Amendment attached to Planning and Development Department, Planning Division Report 2018-105 as Appendix B be approved, rezoning the land from "HC – Highway Commercial" to "HC-48"; and

That staff be directed to prepare the Notice of Passing in accordance with the Planning Act and circulate to all applicable parties; and

That the Director of Planning and Development by directed to present for Council's consideration a report and the proposed site plan of the warehousing facility.

2. Engineering and Operations Department, Engineering Division, Report 2018-103, Subject: Wignell, Michener, Port Colborne and Beaverdam Municipal Drains Engineer Appointment

Council resolved:

That the appointment of Paul Smeltzer P. Eng. of AMEC(FW) be rescinded as per Section 39(2) Chapter D.17 of *the Drainage Act R.S.O. 1990*; and

That Paul Marsh P. Eng. of EWA Engineers Inc. be appointed under Section 78(1) Chapter D.17 of the *Drainage Act R.S.O. 1990*, and that this appointment become effective once the conditions of Section 78(2) have been met; and

That staff be authorized to execute a petition under Section 4 Chapter D.17 of the *Drainage Act R.S.O. 1990* to initiate/incorporate any new works related to municipal roads and/or property; and

That Paul Marsh P. Eng. of EWA Engineers Inc., be appointed under Section 8 Chapter D.17 of the *Drainage Act R.S.O. 1990* for the new works contemplated and any additional petitions under Section 4, related to the Wignell, Michener Port Colborne and Beaver Dam Drains, that may come forward during the Drainage Act process; and

That the Mayor and Clerk be authorized to sign the requisite Engineering Services Agreement for the preparation of new engineer(s) reports for the Wignell, Michener, Port Colborne and Beaverdam Municipal Drains.

3. **Corporate Services Department, Clerk's Division, Report 2018-109, Subject: Leave of Absence from Council**

Council resolved:

That a leave of absence be approved for Councillor John Mayne for a period ending November 30, 2018, or until he resumes attendance, whichever occurs first.

4. **Corporate Services Department, Finance Division, Report 2018-108, Subject: Development Charge Reserve Funds – January 1, 2017 to December 31, 2017**

Council resolved:

That report Corporate Services Department, Finance Division report 2018-108 with respect to Development Charge Reserve Funds January 1, 2017 to December 31, 2017 be received for information.

5. **Cynthia B. Skinner, Member of The Friends of Port Colborne Lighthouses Re: Request for Proclamation of Lighthouse Day, August 7, 2018**

Council resolved:

That August 7, 2018 be proclaimed as "Lighthouse Day" in the City of Port Colborne in accordance with the request received from Cynthia B. Skinner, Member, The Friends of Port Colborne Lighthouses.

6. **Region of Niagara Re: Comments of Province's Draft Agricultural Impact Assessment Guidance Document (PDS Report 29-2018)**

Council resolved:

That the correspondence received from the Region of Niagara Re: Comments on Province's Draft Agricultural Impact Assessment Guidance Document (PDS Report 29-20178), be received for information.

7. **Niagara Central Airport Commission Re: 2nd Quarter Report 2018 for the Niagara Central Dorothy Rungeling Airport**

Council resolved:

That the correspondence received from Richard Rybiak, Chair, Niagara Central Airport Commission Re: Niagara Central Airport Commission 2nd Quarter Report for the Niagara Central Dorothy Rungeling Airport, be received for information.

CARRIED.

8. **Consideration of Items Requiring Separate Discussion:**

Nil.

9. Proclamations:

No. 113 Moved by Councillor B. Butters
Seconded by Councillor D. Elliott

Whereas the 7th of August is International Lighthouse Day, therefore we seek recognition here by having Lighthouse Day declared in Port Colborne; and

Whereas this recognition acknowledges our rich marine based history, culture and industry; and

Whereas Port Colborne is unique, having 2 lighthouses connected by a tunnel; and

Whereas we are able to have tours to same, through co-operative inter-agency agreements, thus meeting the publics ever growing interest in lighthouses; and

Whereas this public interest re-enforces Friends of Port Colborne Lighthouses efforts to increase access and gain stewardship so that they may be properly preserved, restored, maintained and shared with the public for future generations; and

Now therefore, I, Mayor, John Maloney, proclaim August 7th as "Lighthouse Day" in the City of Port Colborne.

CARRIED.

10. Minutes of Boards, Commissions & Committees:

No. 114 Moved by Councillor A. Desmarais
Seconded by Councillor B. Butters

a) That the minutes of the Port Colborne Public Library Board meeting of June 5, 2018, be received.

CARRIED.

11. Consideration of By-laws:

No. 115 Moved by Councillor B. Butters
Seconded by Councillor B. Kenny

That the following by-laws be enacted and passed:

6600/55/18 Being a By-law to Adopt Amendment No. 5 to the Official Plan for the City of Port Colborne

6601/56/18 Being a By-law to Amend Zoning By-law 6575/30/18 Respecting Lands Legally Described as Part Lot 32, Concession 2, Municipally Known as Killaly Street West

6602/57/18 Being a By-law to Appoint Paul Marsh P. Eng. Of EWA Engineers Inc. for the Completion of a New Engineer's Report for the Repair and Improvement of the Wignell, Michener, Port Colborne and Beaverdam Drains situated in the City of Port Colborne and to Rescind By-law No. 5653/84/11 and By-law No. 5666/97/11

6603/58/18 Being a By-law to Adopt, Ratify and Confirm the Proceedings of the Council of The Corporation of the City of Port Colborne at its Regular Meeting of July 23, 2018

CARRIED.

12. Council in Closed Session:

Motion to go into closed session – 7:38 p.m.

No. 116 Moved by Councillor F. Danch
Seconded by Councillor B. Kenny

That Council do now proceed into closed session in order to address the following matter(s):

(a) Minutes of the closed session portion of the following Council meetings: July 9, 2018.

(b) Planning and Development Department, Planning Division Report 2018-102, concerning the potential sale of City-owned land, pursuant to the *Municipal Act, 2001*, Subsection 239(2)(c) a proposed or pending acquisition or disposition of land by the municipality or local board.

(c) Corporate Services Department, Clerk's Division Report 2018-104, Subject: Appointments to Boards and Committees, pursuant to the *Municipal Act, 2001,* Subsection 239(2)(b), personal matters about an identifiable individual, including municipal or local board employees.

(d) Planning and Development Department, By-law Enforcement Division Report 2018-106, concerning an update with respect to ongoing property investigations, pursuant to *Municipal Act, 2001*, Subsection 239(2)(b), personal matters about an identifiable individual, including municipal or local board employees and Subsection 239(2)(e) litigation or potential litigation, including matters before administrative tribunals, affecting the municipality or local board.

(e) Verbal report from the Chief Administrative Officer concerning a human resources matter, pursuant to the *Municipal Act, 2001,* Subsection 239(2)(b), personal matters about an identifiable individual, including municipal or local board employees.

CARRIED.

Motion to rise with report – 9:10 p.m.

No. 117 Moved by Councillor A. Desmarais
Seconded by Councillor B. Butters

That Council do now rise from closed session with report at approximately 9:10 p.m.

CARRIED.

13. Disclosures of Interest Arising From Closed Session:

Nil.

14. Report/Motions Arising From Closed Session:

(b) Planning and Development Department, Planning Division Report 2018-102, concerning the potential sale of City-owned land, pursuant to the *Municipal Act, 2001*, Subsection 239(2)(c) a proposed or pending acquisition or disposition of land by the municipality or local board.

The City Clerk reported that direction was provided to the Direct of Planning and Development during closed session in accordance with the *Municipal Act, 2001*.

(c) Corporate Services Department, Clerk's Division Report 2018-104, Subject: Appointments to Boards and Committees, pursuant to the *Municipal Act, 2001,* Subsection 239(2)(b), personal matters about an identifiable individual, including municipal or local board employees.

That the Deputy Clerk be directed to bring forward a report in open session with respect to appointments to boards and committees recommended by Council, as follows;

That Alison Chambers be appointed to the Accessibility Advisory Committee for a term ending December 31, 2022; and

That Connie Butter be appointed to the Senior Citizen Advisory Council for a term ending December, 31, 2019.

(d) Planning and Development Department, By-law Enforcement Division Report 2018-106, concerning an update with respect to ongoing property investigations, pursuant to *Municipal Act, 2001*, Subsection 239(2)(b), personal matters about an identifiable individual, including municipal or local board employees and Subsection 239(2)(e) litigation or potential litigation, including matters before administrative tribunals, affecting the municipality or local board.

The City Clerk reported that direction was provided to the Supervisor, By-law Enforcement during closed session in accordance with the *Municipal Act, 2001*.

(e) Verbal report from the Chief Administrative Officer concerning a human resources matter, pursuant to the *Municipal Act, 2001,* Subsection 239(2)(b), personal matters about an identifiable individual, including municipal or local board employees.

The City Clerk reported that Council received the verbal report from the Chief Administrative Officer during closed session in accordance with the *Municipal Act, 2001*.

15. Adjournment:

No. 118 Moved by Councillor F. Danch
Seconded by Councillor D. Elliott

That the Council meeting be adjourned at approximately 9:11 p.m.
CARRIED.

John Maloney
Mayor

Amber LaPointe
City Clerk

AL/cm

City of Port Colborne
Regular Committee of the Whole Meeting 16-18
Minutes

Date:	July 23, 2018
Time:	6:30 p.m.
Place:	Council Chambers, Municipal Offices, 66 Charlotte Street, Port Colborne
Members Present:	R. Bodner, Councillor B. Butters, Councillor F. Danch, Councillor A. Desmarais, Councillor D. Elliott, Councillor B. Kenny, Councillor J. Maloney, Mayor (presiding officer)
	Absent: Y. Doucet, Councillor (due to vacation) J. Mayne, Councillor (leave of absence)
Staff Present:	D. Aquilina, Director of Planning and Development T. Cartwright, Fire Chief A. Grigg, Director of Community and Economic Development N. Halasz, Manager of Parks and Recreation A. LaPointe, Manager of Legislative Services/City Clerk (minutes) C. Lee, Director of Engineering and Operations S. Luey, Chief Administrative Officer P. Senese, Director of Corporate Services

Also in attendance were interested citizens, members of the news media and WeeStreem.

1. Call to Order:

Mayor Maloney called the meeting to order.

2. Introduction of Addendum Items:

Nil.

3. Confirmation of Agenda:

Moved by Councillor B. Kenny
Seconded by Councillor A. Desmarais

That the agenda dated July 23, 2018 be confirmed, as circulated or as amended.

CARRIED.

2. Engineering and Operations Department, Engineering Division, Report 2018-103, Subject: Wignell, Michener, Port Colborne and Beaverdam Municipal Drains Engineer Appointment

Moved by Councillor R. Bodner
Seconded by Councillor B. Butters

That the appointment of Paul Smeltzer P. Eng. of AMEC(FW) be rescinded as per Section 39(2) Chapter D.17 of *the Drainage Act R.S.O. 1990*; and

That Paul Marsh P. Eng. of EWA Engineers Inc. be appointed under Section 78(1) Chapter D.17 of the *Drainage Act R.S.O. 1990*, and that this appointment become effective once the conditions of Section 78(2) have been met; and

That staff be authorized to execute a petition under Section 4 Chapter D.17 of the *Drainage Act R.S.O. 1990* to initiate/incorporate any new works related to municipal roads and/or property; and

That Paul Marsh P. Eng. of EWA Engineers Inc., be appointed under Section 8 Chapter D.17 of the *Drainage Act R.S.O. 1990* for the new works contemplated and any additional petitions under Section 4, related to the Wignell, Michener Port Colborne and Beaver Dam Drains, that may come forward during the Drainage Act process; and

That the Mayor and Clerk be authorized to sign the requisite Engineering Services Agreement for the preparation of new engineer(s) reports for the Wignell, Michener, Port Colborne and Beaverdam Municipal Drains.

CARRIED.

14. Notice of Motion:

Nil.

15. Adjournment:

Moved by Councillor F. Danch
Seconded by Councillor D. Elliott

That the Committee of the Whole meeting be adjourned at approximately 7:31p.m.

CARRIED.

AL/cm